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January 31, 2013

Mr. Steve Olea
Director, Utilities Division
Arizona Corporation Commission
1200 W. Washington Street
Phoenix, AZ 85007

Re: Ten-Year Plan – Eighth Biennial Electric Transmission Assessment for 2014 through 2023; Docket No. E-00000D-13-0002

Dear Mr. Olea:

Enclosed are an original and thirteen (13) copies of The Salt River Project's 2013-2022 Ten-Year Transmission Plan filed pursuant to A.R.S. Section §40-360-02.

Please contact Mr. Steve Cobb, Director, Transmission Planning Department at (602) 236-3965 if you have any questions concerning this plan.

Sincerely,

Robert R. Taylor

RRT/jkb

Enclosures (14)

Arizona Corporation Commission
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Salt River Project Ten Year Plan Transmission Projects 2013-2022

Prepared for the Arizona Corporation

January 2013

Docket No. E-00000D-13-0002

Table of Contents

Introduction	1
Regional Planning Forums.....	1
Biennial Transmission Assessment (BTA) Order Requirements	3
7 th BTA Order Requirements.....	3
Prior BTA Order Requirements	3
SRP Ten Year Plan Study Work	5
Changes from Previous Plan	5
Projects Placed in Service in 2012	5
Revised Project and Substation Names	5
Revised In-Service Dates.....	5
New Projects.....	5
Removed Projects.....	5
Project Maps	6
SRP's 500kV System	8
SRP's 230kV System Overview	9
SRP's 230kV West System	10
SRP's 230kV East System	11
SRP's 115kV System (Eastern Mining Area).....	12
Project Descriptions	13
Receiving Station Names	13
Pinal West – Pinal Central – Abel – Browning 500 & 230kV line (2014-2020)	14
Pinal West – Pinal Central – Abel – Browning 500 & 230kV line (2014-2020) continued	15
Desert Basin – Pinal Central 230kV (2014)	16
Superior – Silver King 115kV re-route (2014)	17
SunZia Southwest Transmission 500kV Project (2016).....	18
Eastern Mining Expansion (2016)	19
Price Road Corridor (2016)	20
Rogers – Santan 230kV line (2016)	21
New Superior – New Oak Flat 230kV (2019).....	22
New Oak Flat – Silver King 230kV (2019)	23
Abel – Pfister – Ball 230kV (2020-2021).....	24
Silver King – New Pinto Valley 230kV (2021).....	25
Attachment	26
Attachment 1 – Ten Year Plan Technical Analysis	26

Introduction

This report updates and replaces the ten year transmission plan of the Salt River Project Agricultural Improvement and Power District (SRP), submitted in January 2012 pursuant to A.R.S. Section 40-360.02. The 2013-2022 Plan describes planned transmission lines of 115kV or higher that SRP may construct or participate in over the next ten years.

Regional Planning Forums

SRP continues to be involved in regional and sub-regional planning organizations. SRP's primary goal in its involvement in these various planning activities is to ensure that reliable and economical transmission system is connected to energy sources that provide dependable power at reasonable prices to our customers. Participation in the regional and sub-regional planning organizations also allows SRP to better assess its generation options and ensures SRP's transmission plans are coordinated with the plans of the other transmission providers.

The regional and sub-regional planning organizations operate in public forums, develop plans in a collaborative fashion, perform study work cooperatively and disseminate the study results to a broad spectrum of interested and affected parties.

SRP is active in both the Western Electric Coordinating Council (WECC) and WestConnect organizations. WECC's Planning Coordination Committee (PCC) and Transmission Expansion Planning Policy Committee (TEPPC) are important regional planning forums for the Western Interconnection. It is in these forums where SRP and all interested parties discuss and coordinate plans within the ten year planning horizon (PCC) and longer term (more than ten years) policy investigations (TEPPC).

SRP participates in the regional transmission planning activities of WestConnect. WestConnect is comprised of 17 utility companies with transmission assets in the western United States. Its members collaboratively assess stakeholder needs and develop cost-effective transmission and wholesale market enhancements. WestConnect is committed to coordinating its work with other regional industry efforts to achieve as much consistency as possible in the Western Interconnection. Since 2008 the WestConnect Planning Management Committee has completed

and approved annual Ten Year Transmission Plans in which SRP participates. The next WestConnect Ten Year Transmission Plan will be completed in February 2013.

SRP has also been an active participant in the WestConnect regional transmission planning and cost allocation processes recently required by Federal Energy Regulatory Commission (FERC) Order 1000. While SRP is not required to participate in the Order 1000 process, SRP recognizes the importance of maintaining a collaborative and cooperative transmission planning process in the West.

The Southwest Area Transmission Planning Group (SWAT), with its technical study subcommittees, work groups, and task forces, addresses future transmission needs on a sub-regional (desert southwest) basis. SRP is engaged in various SWAT activities and relies on the following SWAT entities to meet obligations for the Arizona Corporation Commission (ACC) and the Ten Year Plan filing: Central Arizona Transmission System (CATS), Colorado River Transmission System (CRT), Southern Arizona Transmission System (SATS), Short Circuit Work Group, Eldorado Valley Study Group, and the Transmission Corridor Work Group. SWAT disseminates its work publically and coordinates its studies and data with other sub-regional planning groups and WestConnect.

Biennial Transmission Assessment (BTA) Order Requirements

7th BTA Order Requirements

The ACC has required jurisdictional entities to notify parties requesting generation or transmission interconnections to the Bulk Electric System of the appropriate ACC filing requirements. While not subject to the ACC's jurisdiction for purposes of the BTA, SRP nevertheless intends to place an advisory notice on SRP's OASIS page or in one of its initial written correspondence with the interconnector to satisfy this requirement. SRP bears no responsibility for the compliance with ACC requirements by any party seeking interconnection.

Prior BTA Order Requirements

The following sections highlight SRP's responses to ongoing activities related to prior BTA orders. The ACC's 6th BTA order adopted several requirements that apply to jurisdictional utilities; however, SRP has agreed to voluntarily comply with the following requirements. The ongoing requirements include:

- a) reporting relevant findings in future BTAs regarding compliance with transmission planning standards (e.g. TPL-001 through TPL-004) from NERC/WECC reliability audits that have been finalized and filed with FERC.
- b) identifying planned transmission reconductor projects, transformer capacity upgrade projects and reactive power compensation facility additions at 115 kV and above in future BTA ten year plan filings.
- c) discussing the effects of distributed renewable generation and energy efficiency programs on future transmission needs in future ten year plan filings.

SRP's voluntary compliance with these requirements is as follows:

Requirement a)

SRP was last audited on its compliance with NERC Standards TPL-001-0, TPL-002-0, and TPL-003-0 in October 2010. The WECC Audit team determined there were no findings on these three Standards. SRP will report relevant NERC audit findings in future BTAs once the findings are finalized and filed with the Federal Energy Regulatory Commission (FERC).

Requirement b)

SRP's planned transmission reconductor, transformer capacity upgrades, and reactive power compensation additions in this ten year period are shown below and are being provided for informational purposes only.

Reactive Devices

SRP currently anticipates the addition of a 500kV shunt reactor as part of the Southeast Valley Project¹. SRP anticipates this reactor will be located at the Pinal Central Substation, and the reactor size is currently estimated to be 170 MVA. The timing of installation of the device is proposed to occur in 2014.

Reconductor

The Rogers - Thunderstone 230kV reconductor project is now planned for 2013.

Transformers

The following are the currently planned transformer additions to existing stations, including the anticipated installation schedule, during this ten year planning horizon:

- Rudd 230/69kV (2019)
- Schrader 230/69kV (2013)

Requirement c)

SRP includes the effects of energy efficiency programs and distributed generation (traditional and renewable) in its resource planning and transmission system models. Thus, each of the transmission projects identified in this ten year transmission plan includes the effects of energy efficiency and distributed generation.

¹ The Pinal West – Pinal Central – Abel – Browning project is commonly referred to as the Southeast Valley project.

SRP Ten Year Plan Study Work

Attachment 1 included with this filing is a study that analyzed the impact on system reliability of the projects identified in the Ten Year Plan. Study work for joint projects relies on sub-regional and previously submitted studies.

Changes from Previous Plan

The following changes are noted between the Ten Year Plan submitted in January 2012 and this submittal. The changes include project or substation names, in-service dates, projects now in service, and newly identified projects.

Projects Placed in Service in 2012

- 3rd Kyrene 500/230kV Transformer

Revised Project and Substation Names

- East Valley Industrial Expansion is now called Price Road Corridor

Revised In-Service Dates

- Superior – Silver King 115kV re-route was 2013, now 2014
- Eastern Mining Expansion was 2015, now 2016
- Abel – Pfister – Ball was 2019-2021, now 2020-2021

New Projects

- SRP has no new projects to submit in this filing.

Removed Projects

The following projects are removed from this ten year plan because SRP is not participating in further development of the project:

- Palo Verde – Delaney – Sun Valley – Morgan Project
which included the following two projects in SRP's prior plans:
 - Sun Valley – Morgan (2016)
 - Palo Verde – Delaney – Sun Valley (2013-2015)
- Pinal Central – Tortolita

The following projects were included in previous plans with TBD in-service dates and have not advanced in SRP's planning process and were removed from the ten year plan with this January 2013 submittal. In order to provide further transparency, SRP will continue to reflect these and other projects under consideration that fall outside of our ten year planning window as "Potential Transmission Projects".

- **Superior 230kV loop-in** – to provide adequate transmission capacity in the event of future load growth in SRP's eastern service territory
- **Thunderstone – Browning 230kV** – to provide additional transfer capability from the south and east to the north and central areas of SRP's service territory
- **Silver King – Knoll – New Hayden 230kV** – to increase the transmission capacity to serve new customer load in SRP's eastern service territory
- **New Hayden 115kV loop-in** – to increase the transmission capacity to serve new customer load in SRP's eastern service territory
- **RS25 Project** – to serve growing Salt River Project – Maricopa Indian Community load
- **RS26 Project** – to serve load growth in the Fountain Hills area and to relieve stress on the lower voltage system that serves the Fountain Hills/Rio Verde area
- **Hassayampa – Pinal West 500kV #2** – to accommodate load growth and access energy sources in the central Arizona region
- **Pinal Central – Abel – RS20 500kV** – for delivery of remote resources into the southeast portion of SRP's service territory
- **Northeast Arizona to Phoenix 500kV** – to facilitate the delivery of resources from Northeast Arizona into eastern metropolitan Phoenix
- **Palo Verde – Saguaro 500kV** – to increase the adequacy of the existing EHV transmission system and permit increased power delivery throughout the state
- **Ball (RS17) 230kV Loop-in** – to serve customer load in the Gilbert/Queen Creek area
- **Silver King – Browning 230kV** – to deliver Coronado or other power in eastern Arizona into SRP's service territory
- **Pinnacle Peak – Brandow 230kV** – to provide adequate transmission capacity to accommodate SRP customer load
- **Browning – Corbell 230kV** – to provide adequate transmission capacity to accommodate future load growth

Project Maps

The following pages are maps showing the location of existing and future transmission projects. Separate maps are provided for the 500kV system, an overview of the 230kV system and then a larger view of the 230kV system broken down into west and east views. The 115kV map primarily covers the 115kV Eastern Mining Area of SRP's service territory; however some 230kV projects are included as well.

The maps included in this report are:

Figure 1 - SRP 500kV system

Figure 2 - SRP 230kV system overview

Figure 3 - Detail of SRP's 230kV west system

Figure 4 - Detail of SRP's 230kV east system

Figure 5 - SRP's 115kV Eastern Mining Area

SRP's 500kV System

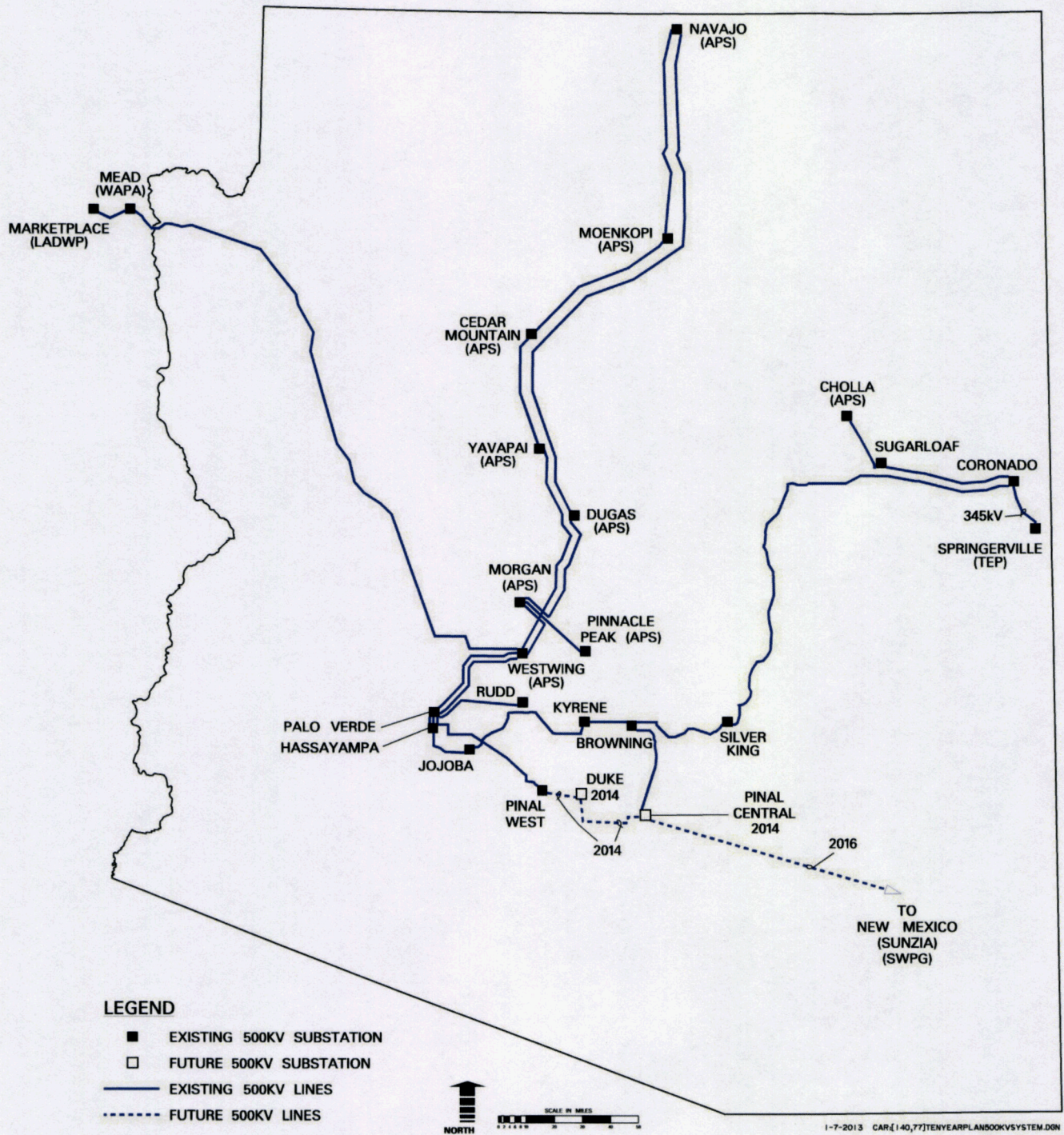
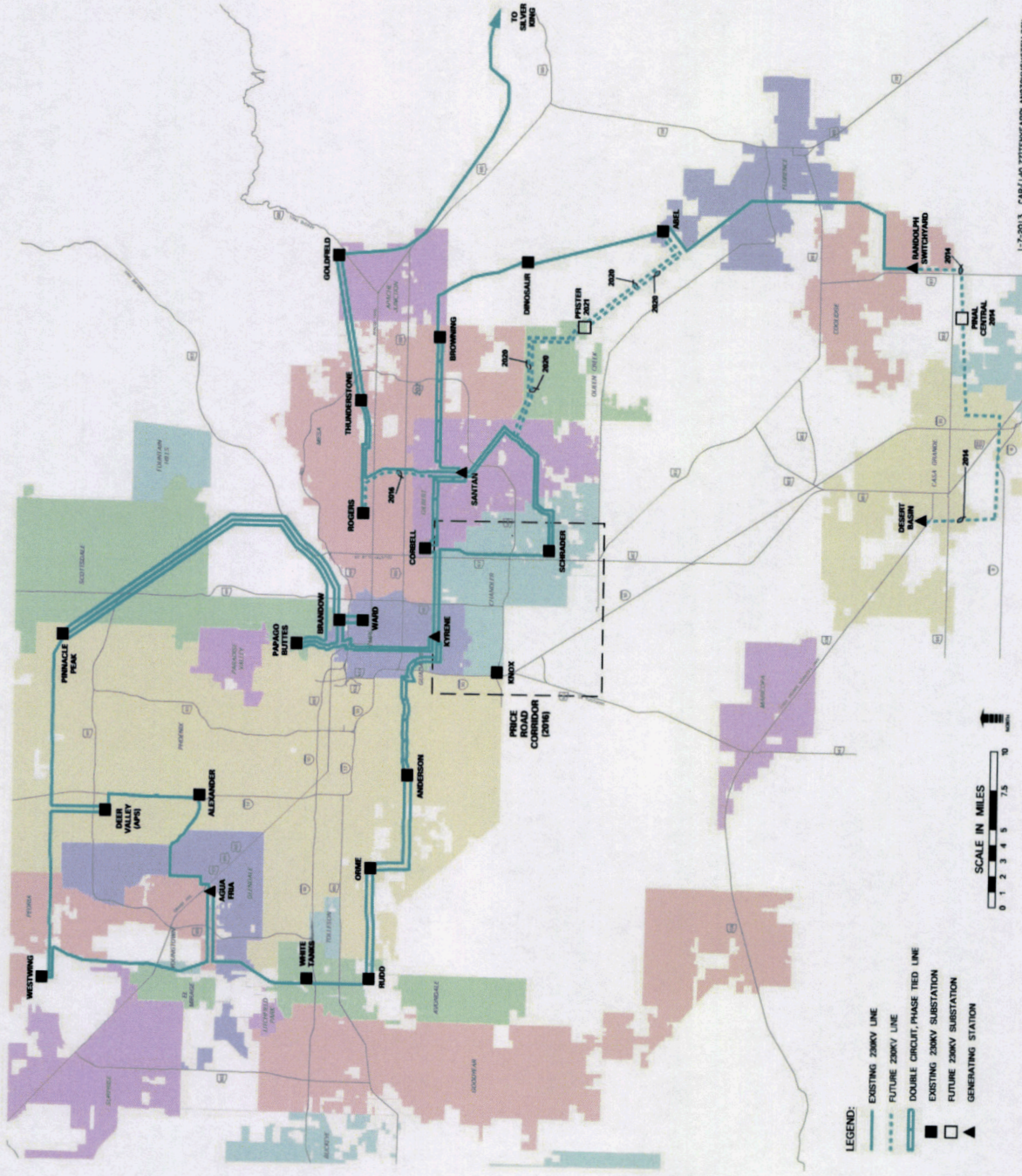


Figure 1 - SRP 500kV system

SRP's 230kV System Overview



SRP's 230kV West System



10

LEGEND:

- EXISTING 230KV LINE
- FUTURE 230KV LINE
- DOUBLE CIRCUIT, PHASE TIED LINE
- EXISTING 230KV SUBSTATION
- FUTURE 230KV SUBSTATION
- GENERATING STATION

SCALE IN MILES

0 1 2 3 4 5 7.5 10

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Figure 4 - Detail of SRP's 230kV East System

SRP's 115kV System (Eastern Mining Area)

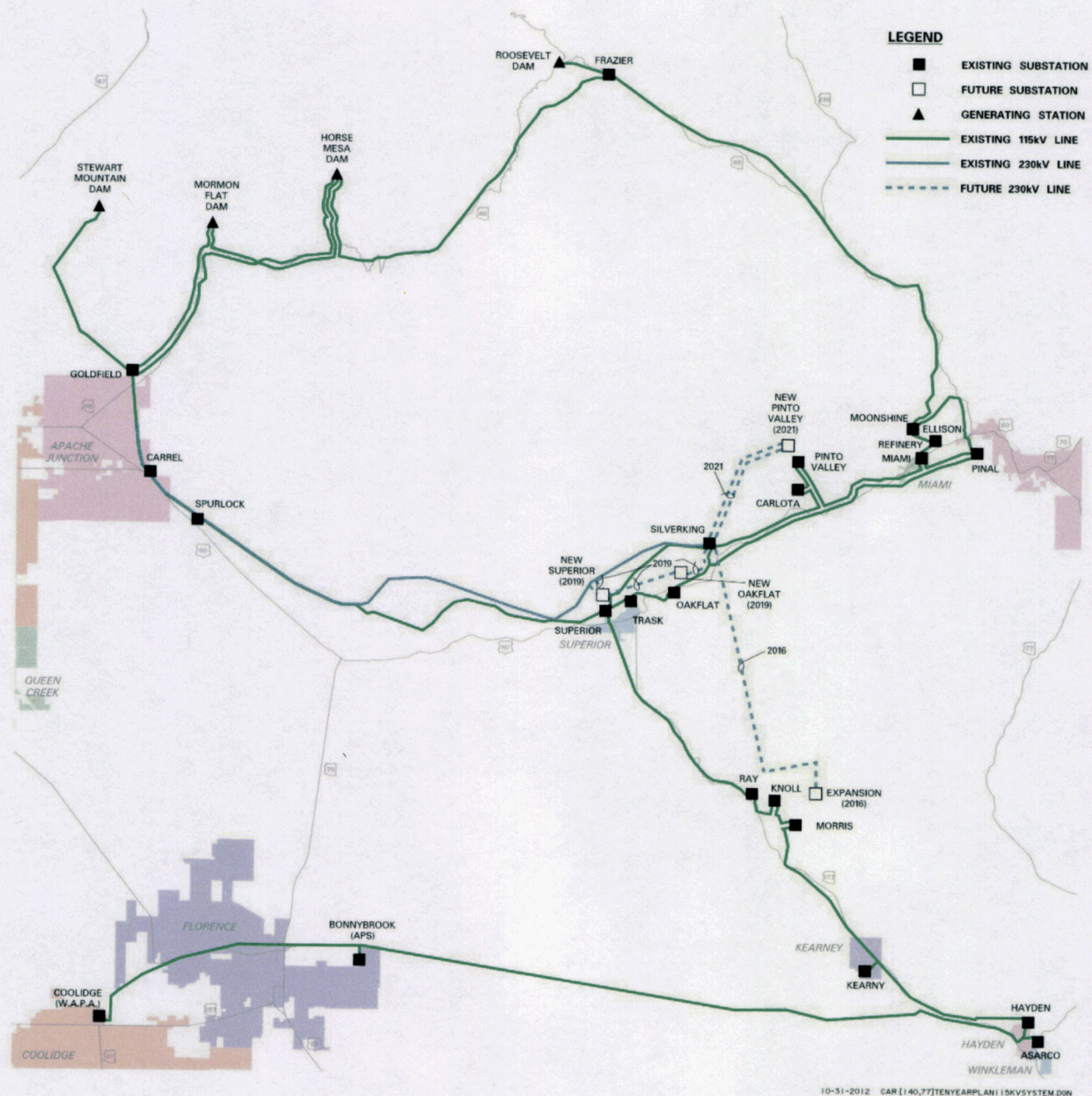


Figure 5 - SRP's Eastern Mining Area (Note: Superior – Silver King 115kV re-route not shown due to scale of map)

Project Descriptions

The following pages provide project detail, meeting the requirements of A.R.S. Section 40-360.02. Each project is identified by name, estimated in-service date, sizing details, routing, purpose, and major milestone dates.

Receiving Station Names

SRP identifies future high voltage stations with an “RS” designation. The “RS” stands for receiving station and this designation is utilized until a formal name is assigned. In this and other documents the following stations may have been identified as an RS station. The following information is provided to identify the receiving station names by their formal names. Not all RS stations have been formally named so there are gaps in the numbering below:

RS16 = Schrader

RS17 = Ball

RS18 = Browning

RS19 = Dinosaur

RS22 = Abel (formerly Southeast Valley, SEV)

RS24 = Pfister

Pinal West – Pinal Central – Abel – Browning 500 & 230kV line (2014-2020)***Size***

<i>Voltage</i>	500 & 230kV
<i>Capacity</i>	Approximately 1500MVA
<i>Point of Origin</i>	Pinal West Substation SEC 18, T5S, R2E
<i>Intermediate point</i>	Duke Substation SEC 30, T5S, R4E
<i>Intermediate point</i>	Pinal Central Substation SEC 30, T6S, R8E
<i>Intermediate point</i>	Randolph Switchyard SEC 10, T6S, R8E
<i>Intermediate point</i>	Abel Substation SEC 19, T3S, R9E
<i>Intermediate point</i>	Dinosaur Substation SEC 10, T2S, R8E
<i>Point of Termination</i>	Browning Substation SEC 12, T1S, R7E
<i>Length</i>	Approximately 100 Miles

Routing

South and east from the Pinal West Substation to approximately Teel Road, then east to the vicinity of the Duke (formerly Santa Rosa) Substation. From Duke easterly to approximately the Santa Rosa Wash, then generally south to approximately a half mile north of I-8 where it turns east again. Then it runs easterly to about the location of the Pinal Central Substation (near the ED2 Substation). From that point the line continues east to the Union Pacific Railroad, where it turns north. It generally runs north from this point to the Abel Substation in the vicinity of the Magma Railroad and the CAP (approximate location of the Abel Substation), then north along the CAP to the existing 500kV corridor between Elliot and Guadalupe Roads. At that point it turns west into the Browning Substation.

Pinal West – Pinal Central – Abel – Browning 500 & 230kV line (2014-2020) continued

Purpose

The Central Arizona Transmission System Study identified a number of system additions necessary to accommodate load growth and access to energy sources in the central Arizona area. This transmission line is the second segment of a series of transmission lines to serve the central Arizona region. This segment will initially provide an interconnection with the Palo Verde market area to market power to the Phoenix and central Arizona areas, and to accommodate the growth in development and population in Pinal County.

Schedule

<i>Right of Way/ Property Acquisition</i>	2005
<i>Construction Start</i>	2006
<i>Estimated In-Service</i>	2014 – Pinal Central – Randolph 230kV 2014 – Pinal Central – Browning 500kV (the voltage and configuration change of the 2010 Randolph-Browning 230kV section). 2014 – Pinal West – Pinal Central 500kV and 230kV 2014 – Pinal Central 500kV and 230kV Substation 2014 – Duke 500kV Substation 2020 – Abel 500kV Substation
<i>Actual In-Service</i>	2007 – Dinosaur Substation 2007 – Dinosaur – Browning 230kV 2010 – Randolph – Browning 500kV energized at 230kV 2010 – Randolph – Abel – Dinosaur 230kV 2011 – Abel 230kV Substation

Notes

The authorization for this project is provided for in the CEC for Case No. 126 (Pinal West to Browning), which was awarded in 2005 (ACC Decision # 68093 and # 68291). SRP was awarded ACC Decisions # 69183 and 70610 that allow for the attachment of the 230kV line to the previously approved 500kV structures. The CEC for the project expires August 25, 2025.

SRP is the project manager for the development of this participant project.

Desert Basin – Pinal Central 230kV (2014)***Size***

<i>Voltage</i>	230kV
<i>Capacity</i>	Approximately 630MVA
<i>Point of Origin</i>	Desert Basin Power Plant Switchyard SEC 13, T6S, R5E
<i>Intermediate point</i>	None
<i>Point of Termination</i>	Pinal Central 230kV Substation SEC 30, T6S, R8E
<i>Length</i>	Approximately 21 miles

Routing

For approximately 6 miles from the Desert Basin Generating Station in Casa Grande near Burris and Kortsen Roads generally south and east to a point on the certificated Pinal West – Pinal Central – Abel – Browning 500kV line near Cornman and Thornton Roads. At that point the 230kV line will be attached to the 500kV structures for approximately 15 miles to the proposed Pinal Central Substation south of Coolidge, AZ.

Purpose

Remove the Remedial Action Scheme installed on Desert Basin Generating Station; improve reliability of the 230kV system in the region by reducing the loading on existing lines in the area; increase local area system capacity; reduce reliance on second party transmission system; and establish the Pinal Central Substation, identified as one of the future injection points of power and energy into the central Pinal County load area.

Schedule

<i>Right of Way/ Property Acquisition</i>	2010-2013
<i>Construction Start</i>	2013
<i>Estimated In-Service</i>	2014

Notes

SRP was granted a CEC for Case No. 132 in June 2007 (ACC Decision # 69647, CEC expires June 6, 2025) for the approximately six mile portion of the project from Desert Basin Generating Station to the vicinity of Cornman and Thornton Roads south of Casa Grande.

Authority for the portion of the 230kV line to be attached to the 500kV structures is addressed in Decision # 69183, which approved SRP's compliance filing for Condition 23 of the CEC in Case No. 126.

Superior – Silver King 115kV re-route (2014)***Size***

<i>Voltage</i>	115kV
<i>Capacity</i>	Approximately 165MVA
<i>Point of Origin</i>	Point on existing Superior - Silver King 115kV Line (SEC 34, T1S, R12E)
<i>Intermediate point</i>	None
<i>Point of Termination</i>	Point on existing Superior - Silver King 115kV Line (SEC 26, T1S, R12E)
<i>Length</i>	Approximately 1 mile

Routing

The new alignment will traverse to the north and west of the historical line and adjacent to the existing Goldfield – Silver King 230kV circuit.

Purpose

To move an existing 115kV line on Customer's private property to accommodate Customer's land use needs.

Schedule

<i>Right of Way/ Property Acquisition</i>	N/A
<i>Construction Start</i>	2013
<i>Estimated In-Service</i>	2014

Notes

SRP was granted a CEC for this project (Case No. 166) on October 4, 2012 (Decision # 73551) which expires in 5 years (October 16, 2017).

SunZia Southwest Transmission 500kV Project (2016)***Size***

<i>Voltage</i>	500kV
<i>Capacity</i>	Approximately 3000MVA
<i>Point of Origin</i>	Central New Mexico
<i>Intermediate point</i>	To be determined
<i>Point of Termination</i>	Pinal Central Substation SEC 30, T6S, R8E
<i>Length</i>	460+ miles

Routing

From Lincoln County area in central New Mexico to Pinal Central Substation in Coolidge, Arizona.

Purpose

Provide access to anticipated renewable generation resources in southeastern Arizona and New Mexico.

Schedule

<i>Right of Way/ Property Acquisition</i>	To be determined
<i>Construction Start</i>	To be determined
<i>Estimated In-Service</i>	2016

Notes

Southwestern Power Group is the project manager on the development of this project. SRP is a participant.

Eastern Mining Expansion (2016)***Size***

<i>Voltage</i>	230kV
<i>Capacity</i>	To be determined
<i>Point of Origin</i>	Silver King 230kV Substation
<i>Intermediate point</i>	None
<i>Point of Termination</i>	New Substation in the vicinity of Knoll or Morris 115kV Stations, tentatively named "Expansion"
<i>Length</i>	Approximately 12-14 miles

Routing

Several options are under consideration, however, the likely routing for the new transmission would be to follow the APS Cholla - Saguaro 500kV line until it crosses SRP's 115kV line. From there, the 230kV line would likely follow SRP's existing Ray - Knoll - Morris 115kV line.

Purpose

Additional lines needed to increase capacity to accommodate growing mining customer load.

Schedule

<i>Right of Way/ Property Acquisition</i>	2015/2016
<i>Construction Start</i>	2016
<i>Estimated In-Service</i>	2016

Notes

SRP does not yet hold a CEC for this project, but will be seeking a Certificate subsequent to an environmental and public process to site the line.

Price Road Corridor (2016)**Size**

<i>Voltage</i>	230kV
<i>Capacity</i>	To be determined
<i>Point of Origin</i>	Kyrene Substation
<i>Intermediate points</i>	Knox, RS27 and RS28 Substations
<i>Point of Termination</i>	Schrader Substation
<i>Length</i>	Approximately 12-23 miles

Routing

The project will consist of a new single-circuit 230kV line from the Schrader Substation in southwest Chandler to a new RS28 Substation, located to the west in the southern portion of the Price Road Corridor in Chandler; a new double-circuit 230kV line from the Knox Substation, located just south of the I-10 and Loop 202 freeway interchange in the westernmost tip of Chandler, to a new RS27 Substation to be located in the northern portion of the Price Road Corridor, south of the Loop 202 freeway, in Chandler; a new double-circuit 230kV line to connect the two new substations; and a single-circuit 230kV line between the Knox Substation in Chandler and the Kyrene Substation, located at the intersection of Elliott and Kyrene Roads in south Tempe. This project will be built in phases with the first phase being energized in 2016.

Purpose

To serve growing industrial and commercial customer loads along the Price Road Corridor, adjacent to Price Road in south Tempe and Chandler.

Schedule

<i>Right of Way/ Property Acquisition</i>	2014-2015
<i>Construction Start</i>	2015
<i>Estimated In-Service</i>	2016

Notes

SRP does not yet hold a CEC for this project, but will be seeking a Certificate. SRP has initiated an environmental and public process to site the line.

Rogers – Santan 230kV line (2016)***Size***

<i>Voltage</i>	230kV
<i>Capacity</i>	Approximately 875MVA
<i>Point of Origin</i>	Rogers Substation SEC 13, T1N, R5E
<i>Intermediate point</i>	None
<i>Point of Termination</i>	Santan Substation SEC 21, T1S, R6E
<i>Length</i>	Approximately 9 miles

Routing

Generally east and south from Rogers to the Santan Substation, using existing circuit positions on existing structures, where possible.

Purpose

Provide adequate transmission facilities to deliver reliable power and energy to SRP's customers in the eastern valley area by upgrading existing conductors and circuits.

Schedule

<i>Right of Way/ Property Acquisition</i>	Not Applicable
<i>Construction Start</i>	2015
<i>Estimated In-Service</i>	2016

Notes

SRP does not anticipate needing a CEC for this project as it currently entails only reconductoring and splitting parallel lines.

New Superior – New Oak Flat 230kV (2019)***Size***

<i>Voltage</i>	230kV
<i>Capacity</i>	To be determined
<i>Point of Origin</i>	A New 230kV Substation near the existing Goldfield – Silver King 230kV line, tentatively named “New Superior”
<i>Intermediate point</i>	None
<i>Point of Termination</i>	New 230kV Substation near Oak Flat
<i>Length</i>	Approximately 3.5 miles

Routing

The alignment will traverse through the customer’s property near the customer’s northern property boundary. The alignment is predominantly east to west. The location of the New Superior and the New Oak Flat sites are still being determined. The preliminary 230kV alignment will be identified after these details are received.

Purpose

To serve growing customer loads at Oak Flat.

Schedule

<i>Right of Way/ Property Acquisition</i>	N/A
<i>Construction Start</i>	2017
<i>Estimated In-Service</i>	2019

Notes

SRP does not yet hold a CEC for this project, but will be seeking a Certificate subsequent to an environmental and public process to site the line.

This is one of three segments of the Eastern Mining Area expansion to accommodate new customer load: New Superior – New Oak Flat, New Oak Flat – Silver King, and Silver King – New Pinto Valley.

New Oak Flat – Silver King 230kV (2019)

<i>Size</i>	
<i>Voltage</i>	230kV
<i>Capacity</i>	To be determined
<i>Point of Origin</i>	A New 230kV Substation near the existing Oak Flat 115kV Station, tentatively named “New Oak Flat”
<i>Intermediate point</i>	None
<i>Point of Termination</i>	Silver King 230kV Substation
<i>Length</i>	Approximately 3 miles

<i>Routing</i>
The alignment will closely follow the existing 115kV circuit connecting Silver King to Oak Flat. Line starts at the New Oak Flat 230kV Substation, heading northwest and then turning north into Silver King Receiving Station.

<i>Purpose</i>
To serve growing customer loads at Oak Flat.

Schedule	
<i>Right of Way/ Property Acquisition</i>	N/A
<i>Construction Start</i>	2017
<i>Estimated In-Service</i>	2019

<i>Notes</i>
SRP does not yet hold a CEC for this project, but will be seeking a Certificate subsequent to an environmental and public process to site the line.
This is one of three segments of the Eastern Mining Area expansion to accommodate new customer load: New Superior – New Oak Flat, New Oak Flat – Silver King, and Silver King – New Pinto Valley.

Abel – Pfister – Ball 230kV (2020-2021)**Size**

<i>Voltage</i>	230kV
<i>Capacity</i>	To be determined
<i>Point of Origin</i>	Future Ball (RS17) Substation SEC 1, T2S, R6E
<i>Intermediate point</i>	Future Pfister (RS24) Substation SEC 25, T2S, R7E
<i>Point of Termination</i>	Abel Substation SEC 19, T3S, R9E
<i>Length</i>	Approximately 20 miles

Routing

Generally south and east from a point on the Santan to Schrader 230kV line near the future Ball (RS17) Substation to the Pfister (RS24) Substation in the southeastern portion of the town of Queen Creek, continuing south and east to the future Abel Substation.

Purpose

To meet expected load growth in the eastern service territory.

Schedule

<i>Right of Way/ Property Acquisition</i>	2013-2016
<i>Construction Start</i>	2018-2019
<i>Estimated In-Service</i>	2020 – Abel - Pfister - Santan 230kV line 2020 – Abel - Pfister - Schrader 230kV line 2021 – Pfister Substation

Notes

This project was formerly known as Abel - Moody. SRP received a CEC for this project on December 23, 2009, Case No. 148, Decision # 71441. The CEC expires December 23, 2021.

This project is a double circuit 230kV line and a 230/69kV substation.

Silver King – New Pinto Valley 230kV (2021)**Size**

<i>Voltage</i>	230kV
<i>Capacity</i>	To be determined
<i>Point of Origin</i>	Silver King 230kV
<i>Intermediate point</i>	None
<i>Point of Termination</i>	A New 230kV Substation near the existing Pinto Valley 115kV Station, tentatively named “New Pinto Valley”
<i>Length</i>	Approximately 7 miles

Routing

The anticipated route for this project parallels the existing Coronado - Silver King 500kV line out of Silver King to the north until it turns east to terminate at a Substation proposed in the vicinity of the existing 115kV Pinto Valley Station.

Purpose

To serve growing customer loads at Pinto Valley.

Schedule

<i>Right of Way/ Property Acquisition</i>	N/A
<i>Construction Start</i>	2019
<i>Estimated In-Service</i>	2021

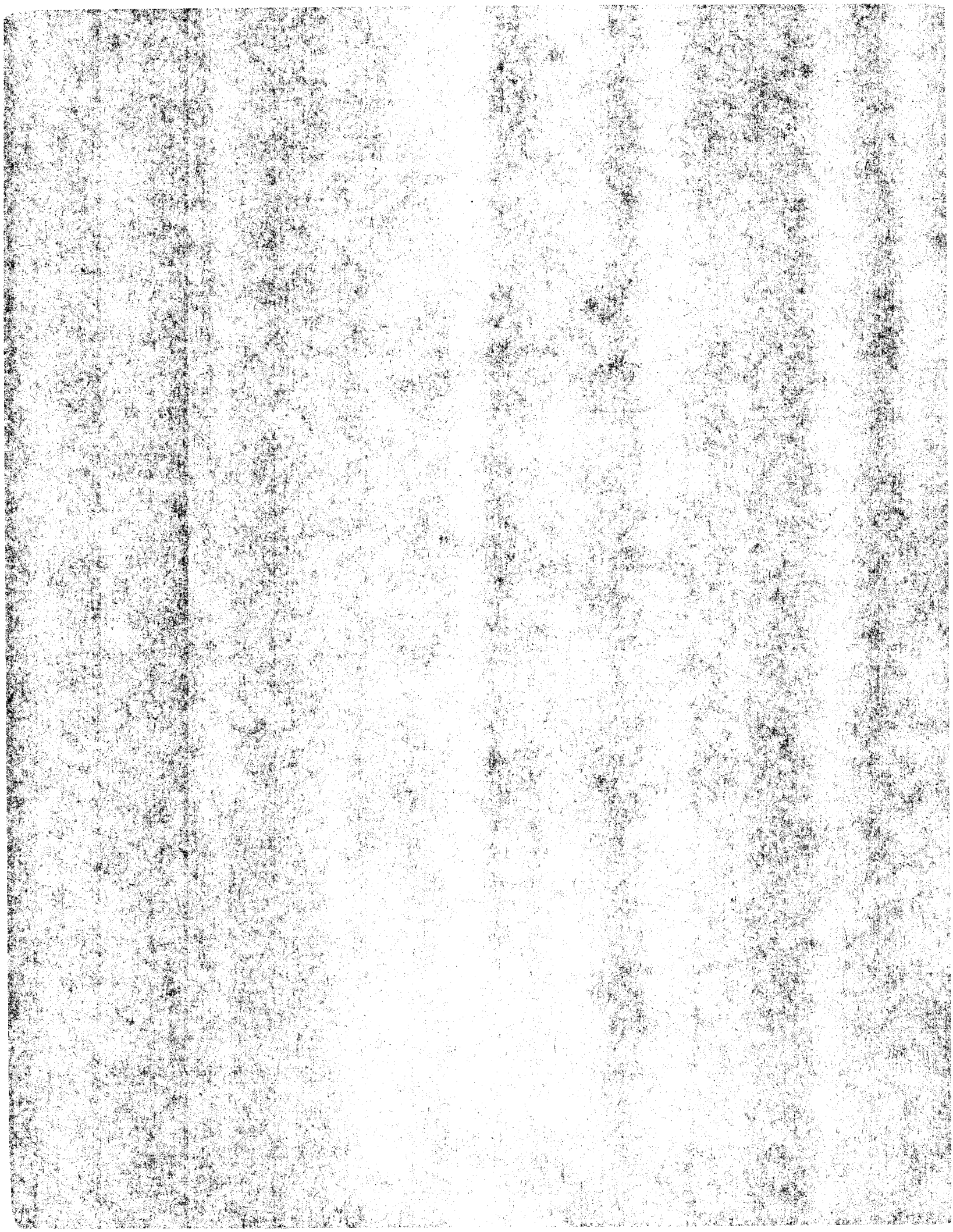
Notes

SRP does not yet hold a CEC for this project, but will be seeking a Certificate subsequent to an environmental and public process to site the line.

This is one of three segments of the Eastern Mining Area expansion to accommodate new customer load: New Superior – New Oak Flat, New Oak Flat – Silver King, and Silver King – New Pinto Valley.

Attachment

Attachment 1 – Ten Year Plan Technical Analysis





2013 TEN YEAR PLAN TECHNICAL STUDY

**by
SALT RIVER PROJECT
TRANSMISSION SYSTEM PLANNING**

January 22, 2013

Table of Contents

1.0 Executive Summary.....	1
2.0 Study Details	2
2.1 Case Information.....	2
2.2 Internal Planning Criteria.....	2
2.2.1 All Lines in Service	2
2.2.2 Single Contingency (N-1)	3
2.3 Contingencies.....	3
2.3.1 Power Flow	3
2.3.2 Stability	4
3.0 Results	5
3.1 Power Flow	5
3.2 Stability	5
4.0 Conclusion	6
5.0 Appendix.....	1
Appendix A – System Ratings in 2022	1
Appendix B – WECC TABLE W-1	4
Appendix C – NERC Criteria for Single Contingencies.....	6
Appendix D – Contingency List.....	7
Appendix E – Power Flow Results.....	18
Appendix F – Transient Stability List	20
500kV Outage List	20
230kV Outage List	21
115kV Outage List	23
Appendix G – Transient Stability Plots	24

1.0 Executive Summary

The purpose of the Ten Year Plan Technical Study is to provide supporting documentation to accompany the Ten Year Plan. Salt River Project (SRP) submits an updated ten year plan annually to the Arizona Corporation Commission. The 2013-2022 Plan describes planned transmission lines that SRP may construct or participate in over the next ten years.

The technical study assesses the performance of transmission facilities of 100kV or higher voltage by using power flow and stability analyses. The power flow study is performed for each of the ten years, beginning with 2013. System improvements and upgrades proposed within the ten year plan are included in each case. SRP facilities are studied to meet SRP internal criteria and industry standards.

As a result of the study, one potential overload was identified beginning in 2017. There are currently two 500/230kV transformers located in the Mesquite Generating Station switchyard. These transformers step up the voltage for the existing generation interconnected to the switchyard. Sempra Energy currently plans to construct and interconnect additional Mesquite photo-voltaic generation in 2017. If this generation is interconnected, the transformer capacity will be inadequate to accommodate all generation if one of the two Mesquite transformers is out of service. SRP recently purchased one of the two existing Mesquite combined cycle units. As part of this arrangement, SRP became the operator of the entire plant and the switchyard. As the operator of the switchyard, SRP will work with the affected parties to mitigate any potential overload conditions. The identified facility overload does not impact the rest of the transmission system and is only related to the connection of future Mesquite generation to the Hassayampa switchyard.

The stability study analyzes the transmission system for its ultimate ten year build-out in 2022 to ensure that the planned configuration will return to a stable state following a simulated outage. System improvements and upgrades proposed within the ten year plan are included in the case. The study results showed that the transmission system remains stable following an outage.

2.0 Study Details

Power flow and transient stability studies were completed in General Electric's (GE's) Positive Sequence Load Flow (PSLF) software. The power flow studies monitor SRP facilities for thermal and voltage responses to transmission system disturbances. Following a contingency, SRP facilities greater than 100kV were monitored. The power flow study evaluates the thermal and voltage response, and the transient stability analysis ensures that the system returns to a steady state following a contingency. The following sections highlight the details of the analysis.

2.1 Case Information

The cases used to study each of the years are based upon Western Electricity Coordinating Council (WECC) cases. These cases represent the latest transmission and sub-transmission, load forecast, and resource plans. The cases are updated by SRP and APS to represent a more detailed Arizona system. The 2014 WECC HS3-SA approved case was used as the seed case for the study years 2013 – 2017. The remaining years (2018 – 2022) were developed from the 2021 WECC HS1A approved case. The system ratings for SRP's facilities used in this study were taken from the 2022 base case which can be found in Appendix A.

Each year's case is developed with the corresponding Ten Year Plan proposed projects included, to ensure that the proposed system changes will result in a stable and compliant transmission system. These projects include:

- Pinal West-Pinal Central-Abel-Browning 500 and 230kV line
- Desert Basin-Pinal Central 230kV line
- Rogers-Santan 230kV line
- Abel-Pfister-Ball 230kV line
- Price Rd Corridor (PRC) 230kV line

Projects driven solely by customer load growth requests have not been included in the study years due to the proprietary nature of the information.

2.2 Internal Planning Criteria

SRP uses the following criteria for planning its system. Any situation in which the criteria is not met, the anomaly will be noted in the results.

2.2.1 All Lines in Service

All Lines in Service (ALIS) conditions will not result in overloaded electric facilities or voltage deviations as described below:

- 500/230kV, 230/115kV, and 230/69kV transformers will not be loaded more than 100% of the transformer nominal rating.
- 500kV, 230kV, and 115kV lines and substation conductors will not be loaded in excess of 100% of their summer normal limit.
- Equipment high voltage limits will not be exceeded.

- Customer service entrance voltage limits (high or low) will not be violated. These limits are described below:
 - 230kV and above: the voltage shall not be below 1.0 per unit.
 - 115kV: the voltage magnitude will not drop below the minimum established by ANSI (standard #C84.1-1989 or most current edition, Ref 42) for service entrance voltages as reflected on the high side of the transformer.

2.2.2 Single Contingency (N-1)

Single contingency outage conditions will not result in overloaded electric facilities or voltage deviations as described below:

- 500/230kV, 230/115kV, and 230/69kV transformers will not be loaded to more than 100% of the emergency limit.
- 500kV, 230kV, and 115kV lines and substation conductors will not be loaded in excess of 100% of their emergency limit.
- Equipment voltage limits (high or low) will not be exceeded.
- Outages at 100kV or higher system voltages (including 230/69kV transformers) will not result in loss of load.
- Customer service entrance voltage limits (high or low) will not be violated. These limits are described below:
 - 230kV & above: the voltage deviation at any bus shall not exceed 5% of the pre-outage voltage.
 - 115kV: the voltage magnitude will not drop below the minimum established by ANSI (standard #C84.1-1989 or most current edition) for service entrance voltages as reflected on the high side of the transformer.
- System Stability: All machines in the system are to remain in synchronism with the system as demonstrated by their relative rotor angles.
- System Damping: System damping will exist as demonstrated by the damping of relative rotor angle swings and the damping of voltage magnitude swings.
- Transient Voltage Dip: Voltage swings initiated by a simulated system disturbance shall not cause the voltage at system busses to exceed those limits specified in WECC table W-1 (Appendix B).
- Post Transient Voltage: After fault clearing, steady state system voltages shall remain within those limits specified in WECC table W-1 (Appendix B).
- Transient Frequency Dip: Frequency swings initiated by a simulated system disturbance shall not cause the frequency at system busses to exceed those limits specified in WECC table W-1 (Appendix B).

2.3 Contingencies

2.3.1 Power Flow

SRP developed the single contingency list that simulated outages of all the transmission lines, transformers, and generators in Arizona in accordance with TPL-002 (Appendix C). The transmission line

outages include 500kV, 230kV, and 115kV lines, and the transformer outages include 500/230kV, 230/115kV, and 230/69kV transformers. The list of power flow contingencies can be found in the Appendix D.

2.3.2 Stability

SRP developed a contingency list in accordance with TPL-002 that simulated the three-phase fault of all the SRP transmission facilities for the following voltages: 500kV, 230kV and 115kV. The subsequent element at the faulted bus was taken out of service after the fault. The transient stability contingencies can be found in Appendix F.

3.0 Results

3.1 Power Flow

One future potential overload was identified at the Mesquite switchyard beginning in 2017. In the event one of the two Mesquite 500/230kV transformers was out of service, the remaining transformer would overload if generation interconnected to the Mesquite switchyard was generating at full capacity. The results of the power flow study can be found in Appendix E.

3.2 Stability

The transient stability analysis revealed that the base case was stable. For simulation of faults on SRP facilities, the system was stable and damped. The voltage and frequency at valley buses were within acceptable limits. Due to the volume of plots, the graphs for the transient stability will be made available upon request, as noted in Appendix G.

4.0 Conclusion

The power flow analysis was performed on each of the ten years, beginning in 2013. The transient stability analysis was performed in the last year, 2022, to evaluate the ultimate configuration of the transmission system. The single contingencies simulated in the Power Flow and Transient Stability analysis were simulated on SRP's system according to the NERC TPL-002 standard. Other than the exceptions for the Mesquite transformers in the later years, SRP's system performed within the thermal, voltage, and transient stability boundaries for the studied outages with the projects proposed in the Ten Year Plan. The Mesquite transformer overload is driven by the interconnection of the Mesquite Solar project. SRP will work with the other owners of the plant and the transformers to identify and implement a solution in the event the additional generation is interconnected.

5.0 Appendix

Appendix A – System Ratings in 2022

Voltage (kV)	From Bus	To Bus	Circuit	Continuous Rating (MVA 1)	Emergency Rating (MVA 2)
115	ASARCOSR	ASARCO TAP	1	81	96
115	ASARCO TAP	CRUSHER	1	121	142
115	ASARCO TAP	HAYDENAZ	1	121	142
115	BONNEYTAP	COOLIDGE	1	120	139
115	BONNEYTAP	CRUSHER	1	121	142
115	CARLOTA	PINTOVALLEY	1	161	192
115	CARLOTA	SILVERKING 2	1	161	192
115	CARREL	GOLDFELD	1	160	190
115	CARREL	SPURLOCK	1	161	192
115	ELLISON	GASCLEAN TAP	1	164	194
115	FRAZIER	HORSEMESA	1	161	191
115	FRAZIER	MOONSHINE	1	161	191
115	FRAZIER	ROOSEVELT	1	59	59
115	GASCLEAN	GASCLEAN TAP	1	164	194
115	GOLDFIELD	HORSEMESA	1	181	216
115	GOLDFIELD	STEWART MTN TAP	1	160	190
115	HAYDENAZ	KEARNY TAP	1	121	142
115	HORSEMESA	MORMONFLAT	1	161	192
115	KEARNY	KEARNY TAP	1	160	190
115	KEARNY TAP	MORRISAZ	1	120	120
115	KNOLL	MORRISAZ	1	120	120
115	MIAMI	MIAMI 3	1	161	189
115	MIAMI	PINTOVALLEY	1	159	159
115	MIAMI 3	MIAMI 4	1	159	159
115	MIAMI 3	PINAL	1	121	142
115	MIAMI 4	GASCLEAN TAP	1	159	159
115	MOONSHINE	PINAL	1	159	159
115	MOONSHINE	REFINERY TAP	1	120	120
115	OAKFLAT	SILVERKING TAP1	1	161	192
115	OAKFLAT	TRASK	1	161	192
115	PINAL	SILVERKING TAP1	1	161	192
115	RAY	KNOLL	1	161	192
115	RAY	SUPERIOR	1	161	192
115	REFINERY	REFINERY TAP	1	40	40
115	REFINERY TAP	GASCLEAN TAP	1	161	192
115	SILVERKING	SILVERKING TAP1	1	323	384
115	SILVERKING 2	PINTOVALLEY	1	161	189
115	SILVERKING 2	SUPERIOR	1	161	192
115	SPURLOCK	SUPERIOR	1	161	191
115	STEWART MTN TAP	MORMONFLAT	1	161	192
115	STEWART MTN TAP	STEWART MOUNTAIN	1	60	60
115	SUPERIOR	TRASK	1	161	192

Voltage (kV)	From Bus	To Bus	Circuit	Continuous Rating (MVA 1)	Emergency Rating (MVA 2)
230	ABEL	RANDOLPH	1	1195	1514
230	ABEL	PFISTER	1	823	904
230	ABEL	PFISTER	2	823	904
230	ABEL	SCHRADER	1	823	904
230	AGUAFRIA	ALEXANDER	1	781	797
230	AGUAFRIA	WESTWING WEST	1	797	797
230	AGUAFRIA	WHITETANK	1	723	912
230	ANDERSON	KYRENE NEW	1	781	797
230	BRANDOW	KYRENE	1	773	912
230	BRANDOW	PAPAGOBUTTE	1	773	912
230	BRANDOW	WARD	1	363	432
230	BRANDOW	WARD	2	363	432
230	BROWNING	DINOSAUR	1	823	904
230	BROWNING	RANDOLPH	1	1195	1514
230	BROWNING	SANTAN	1	773	904
230	CORBELL	KYRENE	1	773	912
230	DEERVALLEY	ALEXANDER	1	720	816
230	DEERVALLEY	PINNACLE PEAK SRP	1	637	797
230	DEERVALLEY	WESTWING EAST	1	781	876
230	KYRENE	KYRENE NEW	1	1195	1195
230	KYRENE	SCHRADER	1	725	865
230	MESQUITE	MESQUITE SOLAR	1	390	462
230	MESQUITE	MESQUITE SOLAR	2	390	462
230	ORME	ANDERSON	1	773	797
230	ORME	ANDERSON	2	773	797
230	ORME	RUDD	1	781	924
230	ORME	RUDD	2	781	924
230	PAPAGOBUTTE	KYRENE NEW	1	683	751
230	PAPAGOBUTTE	PINNACLE PEAK SRP	1	773	797
230	PINAL CENTRAL	DESERT BASIN	1	823	904
230	PINAL CENTRAL	RANDOLPH	1	1195	1514
230	PINNACLE PEAK SRP	BRANDOW	1	386	456
230	PINNACLE PEAK SRP	BRANDOW	2	386	456
230	ROGERS	THUNDERSTONE	1	781	924
230	RUDD	WHITETANK	1	773	912
230	SANTAN	CORBELL	1	725	865
230	SANTAN	PFISTER	1	823	904
230	SANTAN	THUNDERSTONE	1	770	770
230	SCHRADER	PFISTER	1	823	904
230	SCHRADER	SANTAN	1	773	797
230	SILVERKING	GOLDFIELD	1	645	769
230	THUNDERSTONE	GOLDFIELD	1	390	462
230	THUNDERSTONE	GOLDFIELD	2	390	462

Voltage (kV)	From Bus	To Bus	Circuit	Continuous Rating (MVA 1)	Emergency Rating (MVA 2)
500	ABEL	BROWNING	1	2971	3551
500	BROWNING	SILVERKING	1	2356	2789
500	CORONADO	SILVERKING	1	1732	2165
500	CORONADO	SUGARLOAF	1	1732	1732
500	HASSYAMPA	ARLINGTON	1	3000	3000
500	HASSYAMPA	HARQUAHALA	1	3000	3000
500	HASSYAMPA	JOJOBA	1	2971	3551
500	HASSYAMPA	PALOVERDE	1	2971	3551
500	HASSYAMPA	PALOVERDE	2	2971	3551
500	HASSYAMPA	PALOVERDE	3	2165	2165
500	HASSYAMPA	PINAL WEST	1	2971	3551
500	JOJOBA	KYRENE	1	2823	2887
500	KYRENE	BROWNING	1	2887	2887
500	PALOVERDE	DELANY	1	2598	2598
500	PALOVERDE	RUDD	1	2823	3360
500	PERKINS	PERKINS PS	1	2598	2598
500	PERKINS PS	PERKINS PS1	1	1732	1732
500	PERKINS PS	WESTWING	1	2598	2598
500	PERKINS PS2	PERKINS PS	1	1732	1732
500	PINAL CENTRAL	ABEL	1	2971	3551
500	PINAL CENTRAL	DUKE	1	2971	3551
500	PINAL CENTRAL	TORTOLITA	1	1732	2217
500	PINAL WEST	DUKE	1	2971	3551
500	SUGARLOAF	CHOLLA	1	1957	2165

Appendix B – WECC TABLE W-1

Name: TPL – (001 thru 004) – WECC – 1 – CR — System Performance Criteria

WECC DISTURBANCE-PERFORMANCE TABLE OF ALLOWABLE EFFECTS ON OTHER SYSTEMS

NERC and WECC Categories	Outage Frequency Associated with the Performance Category (outage/year)	Transient Voltage Dip Standard	Minimum Transient Frequency Standard	Post Transient Voltage Deviation Standard (See Note 3)
A	Not Applicable	Nothing in addition to NERC		
B	≥ 0.33	<p>Not to exceed 25% at load buses or 30% at non-load buses.</p> <p>Not to exceed 20% for more than 20 cycles at load buses.</p>	Not below 59.6 Hz for 6 cycles or more at a load bus.	Not to exceed 5% at any bus.
C	0.033 – 0.33	<p>Not to exceed 30% at any bus.</p> <p>Not to exceed 20% for more than 40 cycles at load buses.</p>	Not below 59.0 Hz for 6 cycles or more at a load bus.	Not to exceed 10% at any bus.
D	< 0.033	Nothing in addition to NERC		

Notes:

1. The WECC Disturbance-Performance Table applies equally to either a system with all elements in service, or a system with one element removed and the system adjusted.
2. As an example in applying the WECC Disturbance-Performance Table, a Category B disturbance in one system shall not cause a transient voltage dip in another system that is greater than 20% for more than 20 cycles at load buses, or exceed 25% at load buses or 30% at non-load buses at any time other than during the fault.

Table W-1

3. *If it can be demonstrated that post transient voltage deviations that are less than the values in the table will result in voltage instability, the system in which the disturbance originated and the affected system(s) shall cooperate in mutually resolving the problem.*
4. *Refer to Figure W-1 for voltage performance parameters.*
5. *Load buses include generating unit auxiliary loads.*
6. *To reach the frequency categories shown in the WECC Disturbance-Performance Table for Category C disturbances, some planned and controlled islanding may occur. Underfrequency load shedding is expected to arrest this frequency decline and assure continued operation within the resulting islands.*
7. *For simulation test cases, the interconnected transmission system steady state loading conditions prior to a disturbance shall be appropriate to the case. Disturbances shall be simulated at locations on the system that result in maximum stress on other systems. Relay action, fault clearing time, and reclosing practice shall be represented in simulations according to the planning and operation of the actual or planned systems. When simulating post transient conditions, actions are limited to automatic devices and no manual action is to be assumed.*

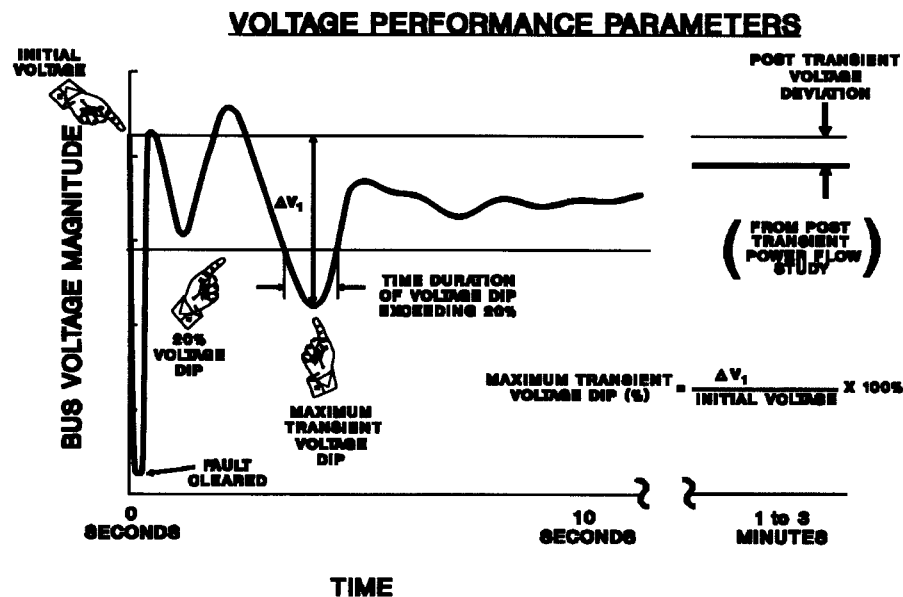


Figure W-1

Appendix C – NERC Criteria for Single Contingencies

Standard TPL-002-0b — System Performance Following Loss of a Single BES Element

Table I. Transmission System Standards — Normal and Emergency Conditions

Category	Contingencies	System Limits or Impacts		
	Initiating Event(s) and Contingency Element(s)	System Stable and both Thermal and Voltage Limits within Applicable Rating ^a	Loss of Demand or Curtailed Firm Transfers	Cascading Outages
A No Contingencies	All Facilities in Service	Yes	No	No
B Event resulting in the loss of a single element.	Single Line Ground (SLG) or 3-Phase (3Ø) Fault, with Normal Clearing: 1. Generator 2. Transmission Circuit 3. Transformer Loss of an Element without a Fault.	Yes Yes Yes Yes	No ^b No ^b No ^b No ^b	No No No No
	Single Pole Block. Normal Clearing ^c : 4. Single Pole (dc) Line	Yes	No ^b	No

Appendix D – Contingency List

Single element contingencies evaluated in the study include:

Line CHOLLA 500.0 to SAGUARO 500.0 Circuit 1
Line CHOLLA 500.0 to SILVERKG 500.0 Circuit 1
Line FOURCORN 500.0 to MOENKOPI 500.0 Circuit 1
Line FOURCORN 500.0 to FCW 500.0 Circuit 1
Line MOENKOPI 500.0 to YAVAPAI 500.0 Circuit 1
Line MOENKOPI 500.0 to RME 500.0 Circuit 1
Line MOENKOPI 500.0 to ELDORDO 500.0 Circuit 1
Line MOENKOPI 500.0 to MARKETPL 500.0 Circuit 1
Line NAVAJO 500.0 to DUGAS 500.0 Circuit 1
Line NAVAJO 500.0 to RME 500.0 Circuit 1
Line NAVAJO 500.0 to CRYSTAL 500.0 Circuit 1
Line YAVAPAI 500.0 to WESTWING 500.0 Circuit 1
Line SNVLY 500.0 to MORGAN 500.0 Circuit 1
Line MORGAN 500.0 to WESTWING 500.0 Circuit 1
Line MORGAN 500.0 to PNPKAPS 500.0 Circuit r1
Line DELANY 500.0 to SNVLY 500.0 Circuit 1
Line SGRLF 500.0 to CHOLLA 500.0 Circuit 1
Line DUGAS 500.0 to MORGAN 500.0 Circuit 1
Line DRPP 500.0 to FCW 500.0 Circuit 1
Line DRPP 500.0 to FCW 500.0 Circuit 2
Line RME 500.0 to FCW 500.0 Circuit 1
Line CHOLLA 345.0 to PRECHCYN 345.0 Circuit 1
Line CHOLLA 345.0 to MAZATZAL 345.0 Circuit 1
Line FOURCORN 345.0 to SAN_JUAN 345.0 Circuit 1
Line FOURCORN 345.0 to WESTMESA 345.0 Circuit 1
Line FOURCORN 345.0 to RIOPUERC 345.0 Circuit 1
Line FOURCORN 345.0 to CHOLLA 345.0 Circuit 1
Line FOURCORN 345.0 to CHOLLA 345.0 Circuit 2
Line PRECHCYN 345.0 to PNPKAPS 345.0 Circuit 1
Line MAZATZAL 345.0 to PNPKAPS 345.0 Circuit 1
Line BUCKEYE 230.0 to LIBERTY 230.0 Circuit 1
Line CACTUS 230.0 to OCOTILLO 230.0 Circuit 1
Line CACTUS 230.0 to PPAPS N 230.0 Circuit 1
Line CASGRAPS 230.0 to DBG 230.0 Circuit 1
Line CHOLLA 230.0 to LEUPP 230.0 Circuit 1
Line COCONINO 230.0 to VERDE S 230.0 Circuit 1
Line CTRYCLUB 230.0 to LINCSTRT 230.0 Circuit 1
Line CTRYCLUB 230.0 to GRNDTRML 230.0 Circuit 1
Line DEERVALY 230.0 to WESTWNGE 230.0 Circuit 1

Line DEERVALY 230.0 to ALEXANDR 230.0 Circuit 1
Line DEERVALY 230.0 to PINPKSRP 230.0 Circuit 1
Line BUCKEYE2 230.0 to BUCKEYE 230.0 Circuit 1
Line EL SOL 230.0 to AGUAFRIA 230.0 Circuit 1
Line FOURCORN 230.0 to PILLAR 230.0 Circuit 1
Line GLENDALE 230.0 to GRNDTRML 230.0 Circuit 1
Line LEUPP 230.0 to COCONINO 230.0 Circuit 1
Line LINCSTRT 230.0 to OCOTILLO 230.0 Circuit 1
Line LINCSTRT 230.0 to WPHXAPSN 230.0 Circuit 1
Line LONEPEAK 230.0 to SUNYSLOP 230.0 Circuit 1
Line LONEPEAK 230.0 to PPAPS E 230.0 Circuit 1
Line MEADOWBK 230.0 to CTRYCLUB 230.0 Circuit 1
Line MEADOWBK 230.0 to SUNYSLOP 230.0 Circuit 1
Line REACH 230.0 to LONEPEAK 230.0 Circuit 1
Line REACH 230.0 to PPAPS C 230.0 Circuit 1
Line PPAPS W 230.0 to PPAPS C 230.0 Circuit 1
Line PPAPS W 230.0 to PINPK 230.0 Circuit 1
Line JOJOBA 230.0 to GILARIVR 230.0 Circuit 1
Line SAGUARO 230.0 to TATMOMLI 230.0 Circuit 1
Line SAGUARO 230.0 to MILLIGAN 230.0 Circuit 1
Line SNTAROSA 230.0 to TATMOMLI 230.0 Circuit 1
Line SNTAROSA 230.0 to DBG 230.0 Circuit 1
Line SNTAROSA 230.0 to TESTTRAK 230.0 Circuit 1
Line SURPRISE 230.0 to EL SOL 230.0 Circuit 1
Line SURPRISE 230.0 to WESTWNGW 230.0 Circuit 1
Line VERDE N 230.0 to VERDE S 230.0 Circuit 1
Line WESTWNGW 230.0 to EL SOL 230.0 Circuit 1
Line WESTWNGW 230.0 to WESTWNGE 230.0 Circuit 1
Line WESTWNGW 230.0 to PINPK 230.0 Circuit 1
Line WHTNKAPS 230.0 to EL SOL 230.0 Circuit 1
Line WHTNKAPS 230.0 to RUDD 230.0 Circuit 1
Line SNVLY 230.0 to HASSY AZ 230.0 Circuit 1
Line WPHXAPSS 230.0 to WPHXAPSN 230.0 Circuit 1
Line WPHXAPSS 230.0 to RUDD 230.0 Circuit 1
Line YAVAPAI 230.0 to VERDE N 230.0 Circuit 1
Line YAVAPAI 230.0 to WILOWLKE 230.0 Circuit 1
Line KYR-NEW 230.0 to OCOTILLO 230.0 Circuit 1
Line KYR-NEW 230.0 to KNOX 230.0 Circuit 1
Line GILARIVR 230.0 to GILABEND 230.0 Circuit 1

Line WPHXAPSN 230.0 to WHTNKAPS 230.0 Circuit 1
 Line FORTROCK 230.0 to ROUNDEVLY 230.0 Circuit 1
 Line FORTROCK 230.0 to JUNIPRMT 230.0 Circuit 1
 Line ALEXNDR 230.0 to ALEXANDR 230.0 Circuit 1
 Line RACEWAY 230.0 to RACEWYWA 230.0 Circuit 1
 Line GLENDALW 230.0 to GLENDALE 230.0 Circuit 1
 Line GLENDALW 230.0 to AGUAFRIA 230.0 Circuit 1
 Line WILOWLKW 230.0 to PRESCOTT 230.0 Circuit 1
 Line WILOWLKW 230.0 to WILOWLKE 230.0 Circuit 1
 Line AVERY 230.0 to RACEWAY 230.0 Circuit 1
 Line AVERY 230.0 to SCTWSH 230.0 Circuit 1
 Line TRLBY 230.0 to TS2 230.0 Circuit 1
 Line TRLBY 230.0 to SNVLY 230.0 Circuit 1
 Line TS2 230.0 to PLMVLY 230.0 Circuit 1
 Line SCTWSH 230.0 to PPAPS W 230.0 Circuit 1
 Line TS4 230.0 to JOJOBA 230.0 Circuit 1
 Line TS4 230.0 to PLMVLY 230.0 Circuit 1
 Line PPAPS C 230.0 to PPAPS E 230.0 Circuit 1
 Line JUNIPRMT 230.0 to SELIGMAN 230.0 Circuit 1
 Line N.GILA 230.0 to TS8 230.0 Circuit 1
 Line MILLIGAN 230.0 to CASGRAPS 230.0 Circuit 1
 Line PPAPS N 230.0 to OCOTILLO 230.0 Circuit 1
 Line PPAPS N 230.0 to PPAPS E 230.0 Circuit 1
 Line PPAPS N 230.0 to PINPKSRP 230.0 Circuit 1
 Line PPAPS N 230.0 to PINPKSRP 230.0 Circuit 2
 Line ADAMS 115.0 to ADAMS TP 115.0 Circuit 1
 Line BONNYBKE 115.0 to BONNYBRK 115.0 Circuit 1
 Line SAG.EAST 115.0 to SAG.WEST 115.0 Circuit 1
 Line SAG.EAST 115.0 to ORACLE 115.0 Circuit 1
 Line SAG.WEST 115.0 to SNMANUEL 115.0 Circuit 1
 Line SAG.WEST 115.0 to ED-5 115.0 Circuit 1
 Line SAG.WEST 115.0 to ED-5B 115.0 Circuit 1
 Line VLYFARMS 115.0 to ORACLE 115.0 Circuit 1
 Line BOOTHILL 115.0 to ADAMS 115.0 Circuit 1
 Line BOOTHILL 115.0 to MURAL 115.0 Circuit 1
 Line CORONADO 500.0 to SGRLF 500.0 Circuit 1
 Line CORONADO 500.0 to SILVERKG 500.0 Circuit 1
 Line PALOVRDE 500.0 to WESTWING 500.0 Circuit 1
 Line PALOVRDE 500.0 to WESTWING 500.0 Circuit 2
 Line PALOVRDE 500.0 to DELANY 500.0 Circuit 1
 Line PALOVRDE 500.0 to RUDD 500.0 Circuit 1
 Line PALOVRDE 500.0 to COLRIVER 500.0 Circuit 1
 Line PERKINPS 500.0 to WESTWING 500.0 Circuit 1

Line SILVERKG 500.0 to SAGUARO 500.0 Circuit 1
 Line ABEL 500.0 to BROWNING 500.0 Circuit 1
 Line PINAL_C 500.0 to ABEL 500.0 Circuit 1
 Line JOJOBA 500.0 to GILARIVR 500.0 Circuit 1
 Line JOJOBA 500.0 to GILARIVR 500.0 Circuit 2
 Line JOJOBA 500.0 to KYRENE 500.0 Circuit 1
 Line HASSYAMP 500.0 to PALOVRDE 500.0 Circuit 1
 Line HASSYAMP 500.0 to PALOVRDE 500.0 Circuit 2
 Line HASSYAMP 500.0 to PALOVRDE 500.0 Circuit 3
 Line HASSYAMP 500.0 to PINAL_W 500.0 Circuit 1
 Line HASSYAMP 500.0 to JOJOBA 500.0 Circuit 1
 Line HASSYAMP 500.0 to ARLINTON 500.0 Circuit 1
 Line HASSYAMP 500.0 to HARQUAHA 500.0 Circuit 1
 Line HASSYAMP 500.0 to MESQUITE 500.0 Circuit 1
 Line HASSYAMP 500.0 to N.GILA 500.0 Circuit 2
 Line BONNEYTP 115.0 to BONNYBRK 115.0 Circuit 1
 Line BONNEYTP 115.0 to COOLIDGE 115.0 Circuit 1
 Line ELLISON 115.0 to 843E2.7N 115.0 Circuit 1
 Line FRAZIER 115.0 to MOONSHIN 115.0 Circuit 1
 Line FRAZIER 115.0 to ROOSEVLT 115.0 Circuit 1
 Line GOLDFELD 115.0 to HORSMESA 115.0 Circuit 1
 Line HAYDENAZ 115.0 to KEARNYTP 115.0 Circuit 1
 Line HORSMESA 115.0 to MRMNFLAT 115.0 Circuit 1
 Line KEARNYTP 115.0 to MORRISAZ 115.0 Circuit 1
 Line KNOLL 115.0 to MORRISAZ 115.0 Circuit 1
 Line MIAMI 115.0 to PINAL 115.0 Circuit 1
 Line MIAMI 115.0 to PINTOVLY 115.0 Circuit 1
 Line MIAMI 115.0 to 843E2.7N 115.0 Circuit 1
 Line MOONSHIN 115.0 to PINAL 115.0 Circuit 1
 Line MOONSHIN 115.0 to 842E2.7N 115.0 Circuit 1
 Line OAKFLAT 115.0 to SILVERT1 115.0 Circuit 1
 Line PINAL 115.0 to SILVERT1 115.0 Circuit 1
 Line RAY 115.0 to KNOLL 115.0 Circuit 1
 Line RAY 115.0 to SUPERIOR 115.0 Circuit 1
 Line REFINERY 115.0 to 842E2.7N 115.0 Circuit 1
 Line SILVERK1 115.0 to SILVERT1 115.0 Circuit 1
 Line SILVERK2 115.0 to SUPERIOR 115.0 Circuit 1
 Line SPURLOCK 115.0 to SUPERIOR 115.0 Circuit 1
 Line 842E2.7N 115.0 to 843E2.7N 115.0 Circuit 1
 Line SNYDHLAZ 115.0 to SNYDHILL 115.0 Circuit 1
 Line AGUAFRIA 230.0 to WESTWNGW 230.0 Circuit 1
 Line AGUAFRIA 230.0 to ALEXANDR 230.0 Circuit 1
 Line AGUAFRIA 230.0 to WHITETNK 230.0 Circuit 1

Line ANDERSON 230.0 to KYR-NEW 230.0 Circuit 1
 Line BRANDOW 230.0 to KYRENE 230.0 Circuit 1
 Line BRANDOW 230.0 to PAPAGOBT 230.0 Circuit 1
 Line BRANDOW 230.0 to WARD 230.0 Circuit 1
 Line BRANDOW 230.0 to WARD 230.0 Circuit 2
 Line CORBELL 230.0 to KYRENE 230.0 Circuit 1
 Line KYRENE 230.0 to KYR-NEW 230.0 Circuit 1
 Line KYRENE 230.0 to SCHRADER 230.0 Circuit 1
 Line ORME 230.0 to ANDERSON 230.0 Circuit 1
 Line ORME 230.0 to ANDERSON 230.0 Circuit 2
 Line ORME 230.0 to RUDD 230.0 Circuit 1
 Line ORME 230.0 to RUDD 230.0 Circuit 2
 Line PAPAGOBT 230.0 to KYR-NEW 230.0 Circuit 1
 Line PAPAGOBT 230.0 to PINPKSRP 230.0 Circuit 1
 Line PINPKSRP 230.0 to BRANDOW 230.0 Circuit 1
 Line PINPKSRP 230.0 to BRANDOW 230.0 Circuit 2
 Line ROGERS 230.0 to THUNDRST 230.0 Circuit 1
 Line ROGERS 230.0 to ROGSWAPA 230.0 Circuit 1
 Line ROGERS 230.0 to ROGSWAPA 230.0 Circuit 2
 Line SANTAN 230.0 to CORBELL 230.0 Circuit 1
 Line SANTAN 230.0 to THUNDRST 230.0 Circuit 1
 Line SCHRADER 230.0 to SANTAN 230.0 Circuit 1
 Line SILVERKG 230.0 to GOLDFELD 230.0 Circuit 1
 Line THUNDRST 230.0 to GOLDFELD 230.0 Circuit 1
 Line THUNDRST 230.0 to GOLDFELD 230.0 Circuit 2
 Line KNOX 230.0 to SNTAROSA 230.0 Circuit 1
 Line BROWNING 230.0 to RANDOLPH 230.0 Circuit 1
 Line ABEL 230.0 to SCHRADER 230.0 Circuit 1
 Line ABEL 230.0 to DINOSAUR 230.0 Circuit 1
 Line ABEL 230.0 to RS-24 230.0 Circuit 1
 Line RUDD 230.0 to PLMVLY 230.0 Circuit 1
 Line RUDD 230.0 to WHITETNK 230.0 Circuit 1
 Line PINAL_C 230.0 to DBG 230.0 Circuit 1
 Line PINAL_C 230.0 to RANDOLPH 230.0 Circuit 1
 Line COPPERVR 230.0 to FRISCO 230.0 Circuit 1
 Line PD-MORNC 230.0 to FRISCO 230.0 Circuit 1
 Line HENDRSON 230.0 to MEAD N 230.0 Circuit 1
 Line BC TAP 230.0 to MEAD N 230.0 Circuit 1
 Line H ALLEN 500.0 to MEAD 500.0 Circuit 1
 Line EQUEST N 500.0 to MEAD 500.0 Circuit 1
 Line MEAD N 230.0 to ARDEN 230.0 Circuit 1
 Line MEAD N 230.0 to EASTSIDE 230.0 Circuit 1
 Line MEAD N 230.0 to NEWPORT 230.0 Circuit 1

Line MEAD N 230.0 to EQUEST 230.0 Circuit 2
 Line MEAD N 230.0 to SINATRA 230.0 Circuit 1
 Line MEAD N 230.0 to HVRA3A4 230.0 Circuit 1
 Line MEAD S 230.0 to PAHRUMP 230.0 Circuit 1
 Line MEAD S 230.0 to EQUEST 230.0 Circuit 1
 Line MEAD S 230.0 to GREENWAY 230.0 Circuit 1
 Line MEAD S 230.0 to DIAMOND 230.0 Circuit 1
 Line MEAD S 230.0 to DIAMOND 230.0 Circuit 2
 Line MEAD S 230.0 to MEAD N 230.0 Circuit 1
 Line MEAD S 230.0 to ELDORDO 230.0 Circuit 1
 Line MEAD S 230.0 to ELDORDO 230.0 Circuit 2
 Line MEAD S 230.0 to MCCULLGH 230.0 Circuit 1
 Line MEAD S 230.0 to MCCULLGH 230.0 Circuit 2
 Line BLYTHE 161.0 to BUCKBLVD 161.0 Circuit 1
 Line BLYTHE 161.0 to GLT TAP 161.0 Circuit 1
 Line BLYTHE 161.0 to HEADGATE 161.0 Circuit 1
 Line BLYTHE 161.0 to BLYTHEAZ 161.0 Circuit 1
 Line BLYTHE 161.0 to NILAND 161.0 Circuit 1
 Line BLYTHE 161.0 to BLYTHESC 161.0 Circuit 1
 Line DAVIS 230.0 to MEAD N 230.0 Circuit 1
 Line DAVIS 230.0 to LONGTIN 230.0 Circuit 1
 Line DAVIS 230.0 to TOPOCK 230.0 Circuit 2
 Line DAVIS 230.0 to MCCULLGH 230.0 Circuit 1
 Line HOVRA5A6 230.0 to MEAD S 230.0 Circuit 1
 Line HOVRA7-9 230.0 to MEAD S 230.0 Circuit 1
 Line MEAD 500.0 to WESTWING 500.0 Circuit 1
 Line MEAD 500.0 to PERKINS 500.0 Circuit 1
 Line MEAD 500.0 to MARKETPL 500.0 Circuit 1
 Line PARKER 161.0 to BLYTHE 161.0 Circuit 1
 Line PARKER 161.0 to BOUSE 161.0 Circuit 1
 Line PARKER 161.0 to HEADGATE 161.0 Circuit 1
 Line PARKER 161.0 to PARKERAZ 161.0 Circuit 1
 Line PARKER 230.0 to EAGLEYE 230.0 Circuit 1
 Line PARKER 230.0 to BLK MESA 230.0 Circuit 1
 Line PARKER 230.0 to HAVASU 230.0 Circuit 1
 Line PARKER 230.0 to HARCUVAR 230.0 Circuit 1
 Line PARKER 230.0 to GENE 230.0 Circuit 1
 Line COOLIDGE 115.0 to VLYFARMS 115.0 Circuit 1
 Line COOLIDGE 115.0 to ED-2 115.0 Circuit 1
 Line COOLIDGE 115.0 to SIGNAL 115.0 Circuit 1
 Line COOLIDGE 115.0 to COOLDGAZ 115.0 Circuit 1
 Line COOLIDGE 230.0 to SUN ARIZ 230.0 Circuit 1
 Line COOLIDGE 230.0 to SUN ARIZ 230.0 Circuit 2

Line BOUSE 161.0 to KOFA 161.0 Circuit 1
 Line BOUSE 161.0 to BOUSE AZ 161.0 Circuit 1
 Line DEL BAC 115.0 to NOGALES 115.0 Circuit 1
 Line EMPIRE 115.0 to CASAGRND 115.0 Circuit 1
 Line GILA 161.0 to KNOB 161.0 Circuit 1
 Line GILA 161.0 to DOME TAP 161.0 Circuit 1
 Line KNOB 161.0 to PILOTKNB 161.0 Circuit 1
 Line LIBERTY 230.0 to WESTWNGW 230.0 Circuit 1
 Line LIBERTY 230.0 to TS4 230.0 Circuit 1
 Line LIBERTY 230.0 to LONE BUT 230.0 Circuit 1
 Line LIBERTY 230.0 to PHXWAPA 230.0 Circuit 1
 Line LIBERTY 345.0 to PEACOCK 345.0 Circuit 1
 Line LONE BUT 230.0 to TESTTRAK 230.0 Circuit 1
 Line LONE BUT 230.0 to SUN ARIZ 230.0 Circuit 1
 Line MCCONICO 230.0 to DAVIS 230.0 Circuit 1
 Line MCCONICO 230.0 to GRIFFITH 230.0 Circuit 1
 Line MCCONICO 230.0 to HARRIS 230.0 Circuit 1
 Line ORACLE 115.0 to ORACLEAZ 115.0 Circuit 1
 Line ADAMS TP 115.0 to NOGALES 115.0 Circuit 1
 Line PHXWAPA 230.0 to LONE BUT 230.0 Circuit 1
 Line PINPK 230.0 to PINPKSRP 230.0 Circuit 1
 Line PINPK 230.0 to PINPKSRP 230.0 Circuit 2
 Line WLTNMOHK 161.0 to GILA 161.0 Circuit 1
 Line WLTNMOHK 161.0 to DOME TAP 161.0 Circuit 1
 Line TUCSON 115.0 to DEL BAC 115.0 Circuit 1
 Line TUCSON 115.0 to ORACLE 115.0 Circuit 1
 Line ED-2 115.0 to SIGNAL 115.0 Circuit 1
 Line ED-2 115.0 to ED-4 115.0 Circuit 1
 Line ED-2 115.0 to BRADY 115.0 Circuit 1
 Line ED-5 115.0 to ED-5B 115.0 Circuit 1
 Line TESTTRAK 230.0 to CASAGRND 230.0 Circuit 1
 Line ED-5B 115.0 to EMPIRE 115.0 Circuit 1
 Line ED-4 115.0 to ED-5 115.0 Circuit 1
 Line HILLTOP 230.0 to MCCONICO 230.0 Circuit 1
 Line N.HAVASU 230.0 to PARKER 230.0 Circuit 1
 Line N.HAVASU 230.0 to TOPOCK 230.0 Circuit 1
 Line HOVRN7N8 230.0 to MEAD S 230.0 Circuit 1
 Line HOVRN5N6 230.0 to MEAD S 230.0 Circuit 1
 Line HOVRN3N4 230.0 to MEAD S 230.0 Circuit 1
 Line HOVRN1N2 230.0 to MEAD S 230.0 Circuit 1
 Line HOVRA1A2 230.0 to MEAD S 230.0 Circuit 1
 Line KOFA 161.0 to DOME TAP 161.0 Circuit 1
 Line GLT TAP 161.0 to KNOB 161.0 Circuit 1

Line PRSCOTWA 230.0 to PRESCOTT 230.0 Circuit 1
 Line PRSCOTWA 230.0 to RNDVLYTP 230.0 Circuit 1
 Line GAVLINWA 230.0 to GAVILNPK 230.0 Circuit 1
 Line GAVLINWA 230.0 to PINPK 230.0 Circuit 1
 Line GAVLINWA 230.0 to PRSCOTWA 230.0 Circuit 1
 Line RACEWYWA 230.0 to WESTWNGE 230.0 Circuit 1
 Line SLRC 230.0 to GILA 230.0 Circuit 1
 Line SLRC 230.0 to GILA 230.0 Circuit 2
 Line GILA 230.0 to NGL-E 230.0 Circuit 1
 Line GILA 230.0 to NGL-W 230.0 Circuit 1
 Line BLACKMTN 115.0 to BLKMTNAZ 115.0 Circuit 1
 Line BLACKMTN 115.0 to DEL BAC 115.0 Circuit 1
 Line BLACKMTN 115.0 to SNYDHILL 115.0 Circuit 1
 Line BRADY 115.0 to BRADYAZ 115.0 Circuit 1
 Line BRADY 115.0 to PICACHOW 115.0 Circuit 1
 Line BRAWLEY 115.0 to BRAWLYAZ 115.0 Circuit 1
 Line BRAWLEY 115.0 to SANXAVER 115.0 Circuit 1
 Line HARCUVAR 230.0 to HARCU AZ 230.0 Circuit 1
 Line HARCUVAR 230.0 to HASSYTAP 230.0 Circuit 1
 Line N.WADDEL 230.0 to RACEWYWA 230.0 Circuit 1
 Line PICACHOW 115.0 to PICACHAZ 115.0 Circuit 1
 Line PICACHOW 115.0 to RED ROCK 115.0 Circuit 1
 Line RATTLSENK 115.0 to TUCSON 115.0 Circuit 1
 Line RATTLSENK 115.0 to TWINPEAK 115.0 Circuit 1
 Line RED ROCK 115.0 to SAG.EAST 115.0 Circuit 1
 Line RED ROCK 115.0 to REDRCKAZ 115.0 Circuit 1
 Line SANDARIO 115.0 to BRAWLEY 115.0 Circuit 1
 Line SANDARIO 115.0 to SANDARAZ 115.0 Circuit 1
 Line SANXAVER 115.0 to SANXAVAZ 115.0 Circuit 1
 Line SANXAVER 115.0 to SNYDHILL 115.0 Circuit 1
 Line SPKHILTP 230.0 to COOLIDGE 230.0 Circuit 1
 Line TWINPEAK 115.0 to TWINPKAZ 115.0 Circuit 1
 Line TWINPEAK 115.0 to SANDARIO 115.0 Circuit 1
 Line LONGTIN 230.0 to TOPOCK 230.0 Circuit 1
 Line GRIFFITH 230.0 to PEACOCK 230.0 Circuit 1
 Line PEACOCK 230.0 to HILLTOP 230.0 Circuit 1
 Line PEACOCK 345.0 to MEAD 345.0 Circuit 1
 Line TOPOCK 230.0 to BLK MESA 230.0 Circuit 1
 Line TOPOCK 230.0 to SOPOINT 230.0 Circuit 1
 Line TOPOCK 230.0 to SOPOINT 230.0 Circuit 2
 Line SUN ARIZ 230.0 to PINAL_C 230.0 Circuit 1
 Line HASSYTAP 230.0 to HASSY AZ 230.0 Circuit 1
 Line HASSYTAP 230.0 to LIBERTY 230.0 Circuit 1

Line RNDVLYTP 230.0 to ROUNDVLY 230.0 Circuit 1
 Line RNDVLYTP 230.0 to PEACOCK 230.0 Circuit 1
 Line ROGSWAPA 230.0 to PINPK 230.0 Circuit 1
 Line ROGSWAPA 230.0 to PINPK 230.0 Circuit 2
 Line ROGSWAPA 230.0 to SPKHILTP 230.0 Circuit 1
 Line TURLY_S 115.0 to BLANCO 115.0 Circuit 1
 Line GALLEGOS 115.0 to BERGIN 115.0 Circuit 1
 Line ANIMAS 115.0 to SULLIVAN 115.0 Circuit 1
 Line ANIMAS 115.0 to BLUFVIEW 115.0 Circuit 1
 Line BERGIN 115.0 to LAKEVIEW 115.0 Circuit 1
 Line BERGIN 115.0 to WESTFORK 115.0 Circuit 1
 Line FOOTHILS 115.0 to HOODMESA 115.0 Circuit 1
 Line FOOTHILS 115.0 to LAKEVIEW 115.0 Circuit 1
 Line FRUITAP 115.0 to FRUITLND 115.0 Circuit 1
 Line FRUITAP 115.0 to HOODMESA 115.0 Circuit 1
 Line GLADETAP 115.0 to LAPLATA 115.0 Circuit 1
 Line GLADETAP 115.0 to BLKGLADS 115.0 Circuit 1
 Line GLADETAP 115.0 to ELPASOTP 115.0 Circuit 1
 Line NAVAJO 115.0 to SAN JUAN 115.0 Circuit 1
 Line BLUFVIEW 115.0 to MESA FM 115.0 Circuit 1
 Line COLLTAP 115.0 to HOODMESA 115.0 Circuit 1
 Line COLLTAP 115.0 to SULLIVAN 115.0 Circuit 1
 Line COLLTAP 115.0 to COLLEG 115.0 Circuit 1
 Line HARE 115.0 to TURLY_S 115.0 Circuit 1
 Line HARE 115.0 to WESTFORK 115.0 Circuit 1
 Line HARE 115.0 to MILAGR 115.0 Circuit 1
 Line HARE 115.0 to ENRON 115.0 Circuit 1
 Line HARTCYN 115.0 to GLADETAP 115.0 Circuit 1
 Line HARTCYN 115.0 to H-H 115.0 Circuit 1
 Line H-H 115.0 to HARE 115.0 Circuit 1
 Line WESTLOOP 115.0 to HOGBAK 115.0 Circuit 1
 Line WESTLOOP 115.0 to GLADETAP 115.0 Circuit 1
 Line WESTLOOP 115.0 to HOODMESA 115.0 Circuit 1
 Line WESTLOOP 115.0 to MESA FM 115.0 Circuit 1
 Line WESTLOOP 115.0 to PRAXAR 115.0 Circuit 1
 Line A-R 115.0 to TURLY_S 115.0 Circuit 1
 Line A-R 115.0 to SAN JUAN 115.0 Circuit 1
 Line CAMINO 230.0 to MEAD S 230.0 Circuit E
 Line CAMINO 230.0 to MEAD S 230.0 Circuit W
 Line FOURCORN 345.0 to PINTO PS 345.0 Circuit 1
 Line SIGURDPS 230.0 to GLENCANY 230.0 Circuit 1
 Line FLAGSTAF 345.0 to GLENCANY 345.0 Circuit 1
 Line FLAGSTAF 345.0 to GLENCANY 345.0 Circuit 2

Line FLAGSTAF 345.0 to PINPKBRB 345.0 Circuit 1
 Line FLAGSTAF 345.0 to PINPKBRB 345.0 Circuit 2
 Line GLEN PS 230.0 to NAVAJO 230.0 Circuit 1
 Line KAYENTA 230.0 to SHIPROCK 230.0 Circuit 1
 Line KAYENTA 230.0 to LNGHOUSE 230.0 Circuit 1
 Line SHIPROCK 115.0 to FRUITAP 115.0 Circuit 1
 Line SHIPROCK 115.0 to PRAXAR 115.0 Circuit 1
 Line SHIPROCK 230.0 to BLKGLADE 230.0 Circuit 1
 Line SHIPROCK 345.0 to SAN_JUAN 345.0 Circuit 1
 Line SHIPROCK 345.0 to FOURCORN 345.0 Circuit 1
 Line NAVAJO 230.0 to LNGHOUSE 230.0 Circuit 1
 Line ABEL 230.0 to RANDOLPH 230.0 Circuit 1
 Line LIBERTY 230.0 to LIBTYPHS 230.0 Circuit 1
 Line PINAL_C 500.0 to TORTOLIT 500.0 Circuit 1
 Line SAGUARO 500.0 to TORTLIT2 500.0 Circuit 1
 Line SAGUARO 500.0 to TORTOLIT 500.0 Circuit 1
 Line SAGUARO 500.0 to TORTOLIT 500.0 Circuit 2
 Line 3PTS345 345.0 to SOUTH 345.0 Circuit 1
 Line GREENLEE 345.0 to COPPERVR 345.0 Circuit 1
 Line GREENLEE 345.0 to WILLOW 345.0 Circuit 1
 Line GREENLEE 345.0 to WINCHSTR 345.0 Circuit 1
 Line HIDALGO 345.0 to GREENLEE 345.0 Circuit 1
 Line MCKINLEY 345.0 to SPRINGR 345.0 Circuit 1
 Line MCKINLEY 345.0 to SPRINGR 345.0 Circuit 2
 Line PINALWES 345.0 to 3PTS345 345.0 Circuit 1
 Line PINALWES 345.0 to SOUTH 345.0 Circuit 1
 Line SAN_JUAN 345.0 to MCKINLEY 345.0 Circuit 1
 Line SAN_JUAN 345.0 to MCKINLEY 345.0 Circuit 2
 Line SOUTH 345.0 to GATEWAY 345.0 Circuit 1
 Line SOUTH 345.0 to GATEWAY 345.0 Circuit 2
 Line SPRINGR 345.0 to CORONADO 345.0 Circuit 1
 Line SPRINGR 345.0 to GREENLEE 345.0 Circuit 1
 Line SPRINGR 345.0 to LUNA 345.0 Circuit 1
 Line SPRINGR 345.0 to VAIL2 345.0 Circuit 1
 Line TORTOLIT 345.0 to NLOOP345 345.0 Circuit 1
 Line VAIL 345.0 to SOUTH 345.0 Circuit 1
 Line WESTWING 345.0 to PINALWES 345.0 Circuit 1
 Line WILLOW 345.0 to BOWIE 345.0 Circuit 1
 Line WILLOW 345.0 to BOWIE 345.0 Circuit 2
 Line WINCHSTR 345.0 to VAIL 345.0 Circuit 1
 Line WINCHSTR 345.0 to WILLOW 345.0 Circuit 1
 Line CANEZ 138.0 to SONOITA 138.0 Circuit 1
 Line CIENEGA 138.0 to S.TRAIL 138.0 Circuit 1

Line CORONA 138.0 to IRVNGTN 138.0 Circuit 1
 Line CORONA 138.0 to SOUTH 138.0 Circuit 1
 Line CRYCROFT 138.0 to NE.LOOP 138.0 Circuit 1
 Line DELCERRO 138.0 to WESTINA 138.0 Circuit 1
 Line DMP 138.0 to ANKLAM 138.0 Circuit 1
 Line DMP 138.0 to NL. EXP 138.0 Circuit 1
 Line DMP 138.0 to N. LOOP 138.0 Circuit 1
 Line DMP 138.0 to NE.LOOP 138.0 Circuit 1
 Line DMP 138.0 to SN.CRUZ 138.0 Circuit 1
 Line DMP 138.0 to TUCSON 138.0 Circuit 1
 Line DREXEL 138.0 to IRVNGTN 138.0 Circuit 1
 Line DREXEL 138.0 to MIDVALE 138.0 Circuit 1
 Line E. LOOP 138.0 to HARRISON 138.0 Circuit 1
 Line E. LOOP 138.0 to NE.LOOP 138.0 Circuit 1
 Line E. LOOP 138.0 to PANTANO 138.0 Circuit 1
 Line E. LOOP 138.0 to ROBERTS 138.0 Circuit 1
 Line GATEWAY 138.0 to VALNCIA 138.0 Circuit 1
 Line GREENVLY 138.0 to CANOARCH 138.0 Circuit 1
 Line HARTT 138.0 to GREENVLY 138.0 Circuit 1
 Line IRVNGTN 138.0 to KINO 138.0 Circuit 1
 Line IRV_RING 138.0 to SOUTH 138.0 Circuit 1
 Line IRVNGTN 138.0 to TECHPARK 138.0 Circuit 1
 Line IRVNGTN 138.0 to TUCSON 138.0 Circuit 1
 Line IRVNGTN 138.0 to VAIL 138.0 Circuit 2
 Line KANTOR 138.0 to CANEZ 138.0 Circuit 1
 Line KANTOR 138.0 to TUBAC 138.0 Circuit 1
 Line LOSREALS 138.0 to VAIL 138.0 Circuit 1
 Line MIDVALE 138.0 to RAYTHEON 138.0 Circuit 1
 Line MIDVALE 138.0 to SPNCER 138.0 Circuit 1
 Line N. LOOP 138.0 to NL. EXP 138.0 Circuit 1
 Line NL. EXP 138.0 to MARANA 138.0 Circuit 1
 Line N. LOOP 138.0 to RANVISTO 138.0 Circuit 1
 Line NL. EXP 138.0 to RILLITO 138.0 Circuit 1
 Line NL. EXP 138.0 to WESTINA 138.0 Circuit 1
 Line NE.LOOP 138.0 to NELS_SVC 138.0 Circuit 1
 Line NE.LOOP 138.0 to RILLITO 138.0 Circuit 1
 Line NOGALES 138.0 to KANTOR 138.0 Circuit 1
 Line ORNGROVE 138.0 to EASTINA 138.0 Circuit 1
 Line ORNGROVE 138.0 to LACANADA 138.0 Circuit 1
 Line ORNGROVE 138.0 to RILLITO 138.0 Circuit 1
 Line PANTANO 138.0 to LOSREALS 138.0 Circuit 1
 Line RANVISTO 138.0 to LACANADA 138.0 Circuit 1
 Line RANVISTO 138.0 to NARANJA 138.0 Circuit 1

Line RANVISTO 138.0 to CATALINA 138.0 Circuit 1
 Line RAYTHEON 138.0 to MEDINA 138.0 Circuit 1
 Line RBWILMOT 138.0 to IRVNGTN 138.0 Circuit 1
 Line RBWILMOT 138.0 to VAIL 138.0 Circuit 1
 Line RILLITO 138.0 to LACANADA 138.0 Circuit 1
 Line ROBERTS 138.0 to HARRISON 138.0 Circuit 1
 Line S.TRAIL 138.0 to ROBERTS 138.0 Circuit 1
 Line SN.CRUZ 138.0 to ANKLAM 138.0 Circuit 1
 Line SN.CRUZ 138.0 to IRVNGTN 138.0 Circuit 1
 Line SNYDER 138.0 to CRYCROFT 138.0 Circuit 1
 Line SNYDER 138.0 to E. LOOP 138.0 Circuit 1
 Line SNYDER 138.0 to NE.LOOP 138.0 Circuit 1
 Line SONOITA 138.0 to VALNCIA 138.0 Circuit 1
 Line SOUTH 138.0 to ASARCO 138.0 Circuit 1
 Line SOUTH 138.0 to CYPRUS 138.0 Circuit 1
 Line SOUTH 138.0 to GREENVLY 138.0 Circuit 1
 Line SOUTH 138.0 to HARTT 138.0 Circuit 1
 Line SOUTH 138.0 to MEDINA 138.0 Circuit 1
 Line SOUTH 138.0 to MIDVALE 138.0 Circuit 1
 Line SOUTH 138.0 to RAYTHEON 138.0 Circuit 1
 Line SOUTH 138.0 to SPNCER 138.0 Circuit 1
 Line SPNCER 138.0 to MEDINA 138.0 Circuit 1
 Line TECHPARK 138.0 to VAIL 138.0 Circuit 1
 Line TORTOLIT 138.0 to MARANA 138.0 Circuit 1
 Line TORTOLIT 138.0 to N. LOOP 138.0 Circuit 4
 Line TORTOLIT 138.0 to NL. EXP 138.0 Circuit 4
 Line TORTOLIT 138.0 to NL. EXP 138.0 Circuit 3
 Line TORTOLIT 138.0 to NL. EXP 138.0 Circuit 2
 Line TORTOLIT 138.0 to NL. EXP 138.0 Circuit 1
 Line TORTOLIT 138.0 to N. LOOP 138.0 Circuit 3
 Line TORTOLIT 138.0 to RANVISTO 138.0 Circuit 1
 Line TUBAC 138.0 to CANEZ 138.0 Circuit 1
 Line TUCSON 138.0 to DELCERRO 138.0 Circuit 1
 Line TUCSON 138.0 to KINO 138.0 Circuit 1
 Line TWNTYSEC 138.0 to E. LOOP 138.0 Circuit 1
 Line TWNTYSEC 138.0 to IRVNGTN 138.0 Circuit 1
 Line UA MED 138.0 to KINO 138.0 Circuit 1
 Line UA MED 138.0 to TUCSON 138.0 Circuit 1
 Line VAIL 138.0 to CIENEGA 138.0 Circuit 1
 Line VAIL 138.0 to FT.HUACH 138.0 Circuit 1
 Line VAIL 138.0 to NOGALES 138.0 Circuit 1
 Line VAIL 138.0 to S.TRAIL 138.0 Circuit 1
 Line BLACKMTN 115.0 to SPNCER 115.0 Circuit 1

Line ROSEMONT 138.0 to GRTRVL 138.0 Circuit 1
 Line SANRIT_S 138.0 to GREENVLY 138.0 Circuit 1
 Line SANRIT_S 138.0 to HARTT 138.0 Circuit 1
 Line SANRIT_S 138.0 to ROSEMONT 138.0 Circuit 1
 Line SOUTH 138.0 to SANRIT_S 138.0 Circuit 1
 Line TORTOLIT 138.0 to NARANJA 138.0 Circuit 1
 Line SOUTH 138.0 to CLEAR 138.0 Circuit 1
 Line CANOARCH 138.0 to CLEAR 138.0 Circuit 1
 Line CYPRUS 138.0 to CLEAR 138.0 Circuit 1
 Line KANTOR 115.0 to CANEZ 115.0 Circuit 1
 Line CANEZ 115.0 to SONOITA 115.0 Circuit 1
 Line SONOITA 115.0 to VALNCIA 115.0 Circuit 1
 Line GATEWAY 115.0 to VALNCIA 115.0 Circuit 1
 Line NOGALES 115.0 to KANTOR 115.0 Circuit 1
 Line SAG.EAST 115.0 to MARANATP 115.0 Circuit 1
 Line APACHE 230.0 to BUTERFLD 230.0 Circuit 1
 Line APACHE 230.0 to RED TAIL 230.0 Circuit 1
 Line APACHE 230.0 to WINCHSTR 230.0 Circuit 1
 Line BICKNELL 115.0 to THREEPNT 115.0 Circuit 1
 Line BUTERFLD 230.0 to SAN RAF 230.0 Circuit 1
 Line DOSCONDO 230.0 to HACKBERY 230.0 Circuit 1
 Line PANTANO 115.0 to KARTCHNR 115.0 Circuit 1
 Line PANTANO 230.0 to NEWTUCSN 230.0 Circuit 1
 Line THREEPNT 115.0 to VALEN-SW 115.0 Circuit 1
 Line APACHE 115.0 to SNM1 115.0 Circuit 1
 Line AVRA 115.0 to SNDARIO 115.0 Circuit 1
 Line BUTERFLD 230.0 to PANTANO 230.0 Circuit 1
 Line CS1 115.0 to THREEPNT 115.0 Circuit 1
 Line MARANA 115.0 to AVRA 115.0 Circuit 1
 Line MARANATP 115.0 to MARANA 115.0 Circuit 1
 Line MORENCI 230.0 to PD-MORNC 230.0 Circuit 1
 Line MORENCI 230.0 to GREEN-SW 230.0 Circuit 1
 Line RED TAIL 230.0 to DOSCONDO 230.0 Circuit 1
 Line THREEPNT 115.0 to SNDARIO 115.0 Circuit 1
 Line SNM1 115.0 to SNMANUEL 115.0 Circuit 1
 Line SNM1 115.0 to HAYDENAZ 115.0 Circuit 1
 Line HACKBERY 230.0 to MORENCI 230.0 Circuit 1
 Line SAHUARIT 230.0 to BICKNELL 230.0 Circuit 1
 Line S.BRKRCH 115.0 to SNMANUEL 115.0 Circuit 1
 Line NEWTUCSN 230.0 to SAHUARIT 230.0 Circuit 1
 Line CS1 345.0 to SOUTH 345.0 Circuit 1
 Line BICKNELL 345.0 to VAIL 345.0 Circuit 1
 Line PINALWES 345.0 to CS1 345.0 Circuit 1

Line MARANATP 115.0 to RATTLSNK 115.0 Circuit 1
 Line DAVIS 230.0 to RIVIERA 230.0 Circuit 1
 Line ORACLE 115.0 to S.BRKRCH 115.0 Circuit 1
 Line ADAMS TP 115.0 to APACHE 115.0 Circuit 1
 Line BROWNING 230.0 to SANTAN 230.0 Circuit 1
 Line KYRENE 500.0 to BROWNING 500.0 Circuit 1
 Line PERK PS2 500.0 to PERKINPS 500.0 Circuit 1
 Line PERKINPS 500.0 to PERK PS1 500.0 Circuit 1
 Line PERKINS 500.0 to PERKINPS 500.0 Circuit 1
 Line BROWNING 500.0 to SILVERKG 500.0 Circuit 1
 Line PINAL_C 500.0 to DUKE 500.0 Circuit 1
 Line PINAL_W 500.0 to DUKE 500.0 Circuit 1
 Line HASSYAMP 500.0 to MESQUIT2 500.0 Circuit 2
 Line ASARCOSR 115.0 to ASARCOTP 115.0 Circuit 1
 Line ASARCOTP 115.0 to HAYDENAZ 115.0 Circuit 1
 Line ASARCOTP 115.0 to CRUSHER 115.0 Circuit 1
 Line BONNEYTP 115.0 to CRUSHER 115.0 Circuit 1
 Line CARLOTA 115.0 to PINTOVLY 115.0 Circuit 1
 Line CARLOTA 115.0 to SILVERK2 115.0 Circuit 1
 Line FRAZIER 115.0 to HORSMESSA 115.0 Circuit 1
 Line GOLDFELD 115.0 to 461E5.1N 115.0 Circuit 1
 Line GASCLEAN 115.0 to 843E2.7N 115.0 Circuit 1
 Line KEARNY 115.0 to KEARNYTP 115.0 Circuit 1
 Line MIAMI 115.0 to MIAMI 3 115.0 Circuit 1
 Line OAKFLAT 115.0 to TRASK 115.0 Circuit 1
 Line SILVERK2 115.0 to PINTOVLY 115.0 Circuit 1
 Line SUPERIOR 115.0 to TRASK 115.0 Circuit 1
 Line CARREL 115.0 to GOLDFELD 115.0 Circuit 1
 Line CARREL 115.0 to SPURLOCK 115.0 Circuit 1
 Line MIAMI 4 115.0 to 843E2.7N 115.0 Circuit 1
 Line MIAMI 3 115.0 to PINAL 115.0 Circuit 1
 Line MIAMI 3 115.0 to MIAMI 4 115.0 Circuit 1
 Line 461E5.1N 115.0 to MRMNFLAT 115.0 Circuit 1
 Line 461E5.1N 115.0 to STEWMTN1 115.0 Circuit 1
 Line MESQUITE 230.0 to MESQUI S 230.0 Circuit 1
 Line MESQUITE 230.0 to MESQUI S 230.0 Circuit 2
 Line SANTAN 230.0 to RS-24 230.0 Circuit 1
 Line SCHRADER 230.0 to RS-24 230.0 Circuit 1
 Line BROWNING 230.0 to DINOSAUR 230.0 Circuit 1
 Line ABEL 230.0 to RS-24 230.0 Circuit 2
 Line LIBERTY 230.0 to RUDD 230.0 Circuit 1
 Line HASSYAMP 500.0 to HDWSH 500.0 Circuit 1
 Line Q043B1 500.0 to HDWSH 500.0 Circuit 1

Line Q043B2 500.0 to HDWSH 500.0 Circuit 1
 Line Q044 230.0 to GILARIVR 230.0 Circuit 1
 Line BAGCAP 115.0 to BAGDAD 115.0 Circuit 1
 Line EAGLEYE 230.0 to BUCKEYE2 230.0 Circuit 1
 Gen ABEL G1 13.8 Unit ID 1
 Gen ABEL G2 13.8 Unit ID 1
 Gen ABEL G3 13.8 Unit ID 1
 Gen ABEL G4 13.8 Unit ID 1
 Gen ABEL G5 13.8 Unit ID 1
 Gen ABEL G6 13.8 Unit ID 1
 Gen ABEL G7 13.8 Unit ID 1
 Gen ABEL G8 13.8 Unit ID 1
 Gen ABEL G9 13.8 Unit ID 1
 Gen AGUAFR 1 13.8 Unit ID 1
 Gen AGUAFR 2 13.8 Unit ID 2
 Gen AGUAFR 3 18.0 Unit ID 1
 Gen ARL-CT1 18.0 Unit ID 1
 Gen ARL-CT2 18.0 Unit ID 1
 Gen ARL-ST1 18.0 Unit ID 1
 Gen CHOLLA 13.8 Unit ID 1
 Gen CHOLLA2 22.0 Unit ID 1
 Gen CHOLLA3 22.0 Unit ID 1
 Gen CHOLLA4 22.0 Unit ID 1
 Gen CORONAD1 22.0 Unit ID 1
 Gen CORONAD2 22.0 Unit ID 1
 Gen DBG-CT1 18.0 Unit ID 1
 Gen DBG-CT2 18.0 Unit ID 1
 Gen DBG-ST1 18.0 Unit ID 1
 Gen DRPP G1 24.0 Unit ID 1
 Gen DRPP G2 24.0 Unit ID 1
 Gen FCNGEN 1 20.0 Unit ID 1
 Gen FCNGEN 2 20.0 Unit ID 1
 Gen FCNGEN 3 20.0 Unit ID 1
 Gen GIL-CT1 18.0 Unit ID 1
 Gen GIL-CT2 18.0 Unit ID 1
 Gen GIL-CT3 18.0 Unit ID 1
 Gen GIL-CT4 18.0 Unit ID 1
 Gen GIL-CT5 18.0 Unit ID 1
 Gen GIL-CT6 18.0 Unit ID 1
 Gen GIL-CT7 18.0 Unit ID 1
 Gen GIL-CT8 18.0 Unit ID 1
 Gen GIL-ST1 18.0 Unit ID 1
 Gen GIL-ST2 18.0 Unit ID 1

Line BUCKEYE2 230.0 to LIBERTY 230.0 Circuit 1
 Line BOUSE 161.0 to BLACK PK 161.0 Circuit 1
 Line BAGDTWN 115.0 to BAGCAP 115.0 Circuit 1
 Line PRESCOTT 115.0 to BAGDTWN 115.0 Circuit 1
 Gen GIL-ST3 18.0 Unit ID 1
 Gen GIL-ST4 18.0 Unit ID 1
 Gen GLENC1-2 13.8 Unit ID 1
 Gen GLENC1-2 13.8 Unit ID 2
 Gen GLENC3-4 13.8 Unit ID 3
 Gen GLENC3-4 13.8 Unit ID 4
 Gen GLENC5-6 13.8 Unit ID 5
 Gen GLENC5-6 13.8 Unit ID 6
 Gen GLENC7-8 13.8 Unit ID 7
 Gen GLENC7-8 13.8 Unit ID 8
 Gen GRIFFTH1 18.0 Unit ID 1
 Gen GRIFFTH2 18.0 Unit ID 2
 Gen GRIFFTH3 18.0 Unit ID 3
 Gen HAVASU12 13.2 Unit ID 1
 Gen HAVASU12 13.2 Unit ID 2
 Gen HGC-CT1 16.0 Unit ID 1
 Gen HGC-CT2 16.0 Unit ID 1
 Gen HGC-CT3 16.0 Unit ID 1
 Gen HGC-ST1 13.8 Unit ID 1
 Gen HGC-ST2 13.8 Unit ID 1
 Gen HGC-ST3 13.8 Unit ID 1
 Gen HOOVERA3 16.5 Unit ID 1
 Gen HOOVERA4 16.5 Unit ID 1
 Gen HOOVERA5 16.5 Unit ID 1
 Gen HOOVERA6 16.5 Unit ID 1
 Gen HOOVERA7 16.5 Unit ID 1
 Gen HOVRA1A2 16.5 Unit ID A1
 Gen HOVRA1A2 16.5 Unit ID A2
 Gen HOVRN1N2 16.5 Unit ID N1
 Gen HOVRN1N2 16.5 Unit ID N2
 Gen HOVRN3N4 16.5 Unit ID N3
 Gen HOVRN3N4 16.5 Unit ID N4
 Gen HOVRN5N6 16.5 Unit ID N5
 Gen HOVRN5N6 16.5 Unit ID N6
 Gen HOVRN7N8 16.5 Unit ID N7
 Gen HOVRN7N8 16.5 Unit ID N8
 Gen KYREN 7A 18.0 Unit ID 1
 Gen KYREN 7S 13.8 Unit ID 1
 Gen MES-CT1 18.0 Unit ID 1

Gen MES-CT2 18.0 Unit ID 1
 Gen MES-CT3 18.0 Unit ID 1
 Gen MES-CT4 18.0 Unit ID 1
 Gen MES-ST1 18.0 Unit ID 1
 Gen MES-ST2 18.0 Unit ID 1
 Gen NAVAJO 1 26.0 Unit ID 1
 Gen NAVAJO 2 26.0 Unit ID 1
 Gen NAVAJO 3 26.0 Unit ID 1
 Gen PALOVRD1 24.0 Unit ID 1
 Gen PALOVRD2 24.0 Unit ID 1
 Gen PALOVRD3 24.0 Unit ID 1
 Gen RED-CT1 18.0 Unit ID 1
 Gen RED-CT2 18.0 Unit ID 1
 Gen RED-CT3 18.0 Unit ID 1
 Gen RED-CT4 18.0 Unit ID 1
 Gen RED-ST1 18.0 Unit ID 1
 Gen RED-ST2 18.0 Unit ID 1
 Gen SAGUARO1 15.5 Unit ID 1
 Gen SAGUARO2 15.5 Unit ID 1
 Gen SANTAN 1 13.8 Unit ID 1
 Gen SANTAN 2 13.8 Unit ID 1
 Gen SANTN 5A 18.0 Unit ID 1
 Gen SANTN 5B 18.0 Unit ID 1
 Gen SANTN 5S 18.0 Unit ID 1
 Gen SANTN 6A 18.0 Unit ID 1
 Gen SANTN 6S 13.8 Unit ID 1
 Gen SLRC-CT1 18.0 Unit ID 1
 Gen SLRC-CT2 18.0 Unit ID 1
 Gen SLRC-ST1 21.0 Unit ID 1
 Gen SOPOINT1 16.0 Unit ID 1
 Gen SOPOINT2 16.0 Unit ID 2
 Gen SOPOINT3 16.0 Unit ID 3
 Gen WPHX CC1 13.8 Unit ID 1
 Gen WPHX CC2 13.8 Unit ID 1
 Gen WPHX CC3 13.8 Unit ID 1
 Gen BOWIE_G1 18.0 Unit ID 1
 Gen BOWIE_G2 18.0 Unit ID 1
 Gen BOWIE_G3 18.0 Unit ID 1
 Gen BOWIE_G4 18.0 Unit ID 1
 Gen BOWIE_S1 18.0 Unit ID 1
 Gen BOWIE_S2 18.0 Unit ID 1
 Gen DMPCCCT#1 13.8 Unit ID 1
 Gen DMPCCCT#2 13.8 Unit ID 1

Gen DMPCCCT#3 13.8 Unit ID 1
 Gen SPR GEN1 19.0 Unit ID 1
 Gen SPR GEN2 19.0 Unit ID 1
 Gen SPR GEN3 21.0 Unit ID 1
 Gen SPR GEN4 21.0 Unit ID 1
 Gen SUNDTGE1 13.8 Unit ID 1
 Gen SUNDTGE2 13.8 Unit ID 1
 Gen SUNDTGE3 13.8 Unit ID 1
 Gen SUNDTGE4 18.0 Unit ID 1
 Gen APACHST2 20.0 Unit ID 1
 Gen APACHST3 20.0 Unit ID 1
 Gen CROSSHYD 69.0 Unit ID 1
 Gen MESQUI S 230.0 Unit ID 1
 Gen MESQUI S 230.0 Unit ID 2
 Gen SANTAN 3 13.8 Unit ID 1
 Gen SANTAN 4 13.8 Unit ID 1
 Gen Q43_GEN1 0.4 Unit ID 1
 Gen Q43_GEN2 0.4 Unit ID 2
 Gen Q044STG1 13.8 Unit ID 1
 Gen Q044STG2 13.8 Unit ID 2
 Gen WPCC4CT1 13.8 Unit ID 1
 Gen WPCC5CT1 15.0 Unit ID 1
 Gen WPCC5CT2 15.0 Unit ID 1
 Gen WPCC5ST1 16.5 Unit ID 1
 Gen OCOTGT1 13.8 Unit ID 1
 Gen WPHX GT1 13.8 Unit ID 1
 Gen OCOTST2 13.8 Unit ID 1
 Gen OCOTST1 13.8 Unit ID 1
 Gen WPHX GT2 13.8 Unit ID 1
 Gen WPHX ST4 12.5 Unit ID 1
 Gen WPHX ST6 12.5 Unit ID 1
 Gen FAIRVW11 12.5 Unit ID 1
 Gen YUCCAGEN 13.8 Unit ID 1
 Gen YUCCACT1 13.2 Unit ID 1
 Gen YUCCACT2 13.2 Unit ID 1
 Gen YUCCACT3 13.8 Unit ID 1
 Gen YUCCACT4 13.8 Unit ID 1
 Gen YUCCACT5 13.8 Unit ID 1
 Gen YUCCACT6 13.8 Unit ID 1
 Gen YCACT1 13.8 Unit ID 1
 Gen YCAST1 13.8 Unit ID 1
 Gen ABITIBI 13.8 Unit ID 1
 Gen CHILDS 2.3 Unit ID 1

Gen IRVING 2.3 Unit ID 1
 Gen FCNGN4CC 22.0 Unit ID H
 Gen FCNGN4CC 22.0 Unit ID L
 Tran ABEL 69.00 to ABEL 230.00 Circuit 1
 Tran AF-NORTH 69.00 to AGUAFRIA 230.00 Circuit 3
 Tran AF-NORTH 69.00 to AGUAFRIA 230.00 Circuit 4
 Tran ALEXANDR 69.00 to ALEXANDR 230.00 Circuit 1
 Tran ALEXANDR 69.00 to ALEXANDR 230.00 Circuit 2
 Tran ANDERSRS 69.00 to ANDERSON 230.00 Circuit 1
 Tran ANDERSRS 69.00 to ANDERSON 230.00 Circuit 2
 Tran ANDERSRS 69.00 to ANDERSON 230.00 Circuit 3
 Tran ANDERSRS 69.00 to ANDERSON 230.00 Circuit 4
 Tran BRANDOW 69.00 to BRANDOW 230.00 Circuit 1
 Tran BRANDOW 69.00 to BRANDOW 230.00 Circuit 2
 Tran BRANDOW 69.00 to BRANDOW 230.00 Circuit 3
 Tran BROWNING 69.00 to BROWNING 230.00 Circuit 4
 Tran CORBELRS 69.00 to CORBELL 230.00 Circuit 2
 Tran CORBELRS 69.00 to CORBELL 230.00 Circuit 3
 Tran CORBELRS 69.00 to CORBELL 230.00 Circuit 4
 Tran DINOSAUR 69.00 to DINOSAUR 230.00 Circuit 1
 Tran KNOX 69.00 to KNOX 230.00 Circuit 2
 Tran KYRENEG 69.00 to KYRENE 230.00 Circuit 2
 Tran KYRENEG 69.00 to KYRENE 230.00 Circuit 3
 Tran KYRENEG 69.00 to KYRENE 230.00 Circuit 4
 Tran ORME RS 69.00 to ORME 230.00 Circuit 1
 Tran ORME RS 69.00 to ORME 230.00 Circuit 2
 Tran ORME RS 69.00 to ORME 230.00 Circuit 3
 Tran ORME RS 69.00 to ORME 230.00 Circuit 4
 Tran PAPAGOBT 69.00 to PAPAGOBT 230.00 Circuit 1
 Tran PAPAGOBT 69.00 to PAPAGOBT 230.00 Circuit 2
 Tran PAPAGOBT 69.00 to PAPAGOBT 230.00 Circuit 3
 Tran PAPAGOBT 69.00 to PAPAGOBT 230.00 Circuit 4
 Tran ROGERS 69.00 to ROGERS 230.00 Circuit 2
 Tran ROGERS 69.00 to ROGERS 230.00 Circuit 4
 Tran RS-24 69.00 to RS-24 230.00 Circuit 1
 Tran RUDD 69.00 to RUDD 230.00 Circuit 1
 Tran SANTAN 69.00 to SANTAN 230.00 Circuit 3
 Tran SANTAN 69.00 to SANTAN 230.00 Circuit 4
 Tran SANTAN 69.00 to SANTAN 230.00 Circuit 5
 Tran SCHRADER 69.00 to SCHRADER 230.00 Circuit 1
 Tran SCHRADER 69.00 to SCHRADER 230.00 Circuit 3
 Tran SCHRADER 69.00 to SCHRADER 230.00 Circuit 4
 Tran THUNDRST 69.00 to THUNDRST 230.00 Circuit 1

Gen FCNGN5CC 22.0 Unit ID H
 Gen FCNGN5CC 22.0 Unit ID L
 Gen AJOSOLAR 12.5 Unit ID 1
 Tran THUNDRST 69.00 to THUNDRST 230.00 Circuit 2
 Tran THUNDRST 69.00 to THUNDRST 230.00 Circuit 3
 Tran THUNDRST 69.00 to THUNDRST 230.00 Circuit 4
 Tran WARD RS 69.00 to WARD 230.00 Circuit 1
 Tran WARD RS 69.00 to WARD 230.00 Circuit 2
 Tran WHITETNK 69.00 to WHITETNK 230.00 Circuit 1
 Tran WHITETNK 69.00 to WHITETNK 230.00 Circuit 3
 Tran GALLEGOS 230.00 to GALLEGOS 115.00 Circuit 1
 Tran SAN_JUAN 230.00 to HOGBAK 115.00 Circuit 1
 Tran WESTWING 500.00 to WESTWNGW 230.00 Circuit 2
 Tran WESTWING 500.00 to WESTWNGW 230.00 Circuit 3
 Tran WESTWING 500.00 to WESTWNGE 230.00 Circuit 1
 Tran GILARIVR 500.00 to GILARIVR 230.00 Circuit 1
 Tran PNPKAPS 500.00 to PPAPS W 230.00 Circuit 1
 Tran PNPKAPS 500.00 to PPAPS E 230.00 Circuit 1
 Tran PNPKAPS 500.00 to PPAPS N 230.00 Circuit 1
 Tran N.GILA 500.00 to N.GILA 230.00 Circuit 1
 Tran PNPKAPS 345.00 to PPAPS C 230.00 Circuit 1
 Tran PNPKAPS 345.00 to PPAPS E 230.00 Circuit 3
 Tran PNPKAPS 345.00 to PPAPS N 230.00 Circuit 2
 Tran SAGUARO 230.00 to SAG.EAST 115.00 Circuit 1
 Tran SAGUARO 230.00 to SAG.WEST 115.00 Circuit 1
 Tran KYRENE 500.00 to KYR-NEW 230.00 Circuit 6
 Tran KYRENE 500.00 to KYRENE 230.00 Circuit 7
 Tran KYRENE 500.00 to KYRENE 230.00 Circuit 8
 Tran SILVERKG 500.00 to SILVERKG 230.00 Circuit 1
 Tran BROWNING 500.00 to BROWNING 230.00 Circuit 1
 Tran BROWNING 500.00 to BROWNING 230.00 Circuit 2
 Tran RUDD 500.00 to RUDD 230.00 Circuit 1
 Tran RUDD 500.00 to RUDD 230.00 Circuit 2
 Tran RUDD 500.00 to RUDD 230.00 Circuit 3
 Tran RUDD 500.00 to RUDD 230.00 Circuit 4
 Tran ABEL 500.00 to ABEL 230.00 Circuit 1
 Tran ABEL 500.00 to ABEL 230.00 Circuit 2
 Tran PINAL_C 500.00 to PINAL_C 230.00 Circuit 1
 Tran PINAL_C 500.00 to PINAL_C 230.00 Circuit 2
 Tran MESQUITE 500.00 to MESQUITE 230.00 Circuit 1
 Tran MESQUITE 500.00 to MESQUITE 230.00 Circuit 2
 Tran GOLDFELD 230.00 to GOLDFELD 115.00 Circuit 1
 Tran GOLDFELD 230.00 to GOLDFELD 115.00 Circuit 2

Tran SILVERKG 230.00 to SILVERK1 115.00 Circuit 1
 Tran SILVERKG 230.00 to SILVERK2 115.00 Circuit 1
 Tran COPPERVR 345.00 to COPPERVR 230.00 Circuit 1
 Tran COPPERVR 345.00 to COPPERVR 230.00 Circuit 2
 Tran MEAD S 230.00 to MEAD 287.00 Circuit 1
 Tran MEAD 345.00 to MEAD N 230.00 Circuit 1
 Tran MEAD 500.00 to MEAD N 230.00 Circuit 1
 Tran MEAD 500.00 to MEAD N 230.00 Circuit 2
 Tran PARKER 161.00 to PARKER 230.00 Circuit 1
 Tran PARKER 161.00 to PARKER 230.00 Circuit 2
 Tran COOLIDGE 230.00 to COOLIDGE 115.00 Circuit 1
 Tran COOLIDGE 230.00 to COOLIDGE 115.00 Circuit 2
 Tran GILA 161.00 to GILA 230.00 Circuit 1
 Tran LIBERTY 345.00 to LIBTYPHS 230.00 Circuit 1
 Tran NGL-E 230.00 to N.GILA 500.00 Circuit 1
 Tran NGL-W 230.00 to N.GILA 500.00 Circuit 1
 Tran CASAGRND 230.00 to CASAGRND 115.00 Circuit 1
 Tran PEACOCK 345.00 to PEACOCK 230.00 Circuit 1
 Tran GLEN PS 230.00 to GLENCANY 230.00 Circuit 1
 Tran GLENCANY 345.00 to GLENCANY 230.00 Circuit 1
 Tran GLENCANY 345.00 to GLENCANY 230.00 Circuit 2
 Tran PINPKBRB 345.00 to PINPK 230.00 Circuit 1
 Tran PINPKBRB 345.00 to PINPK 230.00 Circuit 2
 Tran PINPKBRB 345.00 to PINPK 230.00 Circuit 3
 Tran SHIP PS 230.00 to SHIPROCK 230.00 Circuit 1
 Tran SHIPROCK 230.00 to SHIPROCK 115.00 Circuit 1
 Tran SHIPROCK 345.00 to SHIPROCK 230.00 Circuit 1
 Tran LIBTYPHS 230.00 to LIBERTY 230.00 Circuit 2
 Tran CORONADO 500.00 to CORONADO 345.00 Circuit 1
 Tran CORONADO 500.00 to CORONADO 345.00 Circuit 2
 Tran PINAL_W 500.00 to PINALWES 345.00 Circuit 1
 Tran TORTOLIT 500.00 to TORTOLIT 345.00 Circuit 1
 Tran WESTWING 500.00 to WESTWING 345.00 Circuit 1
 Tran MCKINLEY 345.00 to YAHTAHEY 115.00 Circuit 1
 Tran SOUTH 345.00 to SOUTH 138.00 Circuit 1
 Tran SOUTH 345.00 to SOUTH 138.00 Circuit 2
 Tran VAIL 345.00 to VAIL 138.00 Circuit 1
 Tran VAIL 345.00 to VAIL 138.00 Circuit 3
 Tran VAIL2 345.00 to VAIL 138.00 Circuit 1
 Tran VAIL2 345.00 to VAIL 138.00 Circuit 2
 Tran GATEWAY 138.00 to GATEWAY 345.00 Circuit 1
 Tran IRVMID3 138.00 to IRVNGTN 138.00 Circuit 1
 Tran IRVMID4 138.00 to IRVNGTN 138.00 Circuit 1

Tran SPNCER 138.00 to SPNCER 115.00 Circuit 1
 Tran TORTOLIT 138.00 to SAG.EAST 115.00 Circuit 1
 Tran TORTOLIT 138.00 to SAG.WEST 115.00 Circuit 1
 Tran TORTOLIT 138.00 to TORTLIT2 500.00 Circuit 1
 Tran TORTOLIT 138.00 to TORTOLIT 500.00 Circuit 1
 Tran TORTOLIT 138.00 to TORTOLIT 500.00 Circuit 2
 Tran TORTOLIT 138.00 to TORTOLIT 500.00 Circuit 3
 Tran TORTOLIT 138.00 to TORTOLIT 500.00 Circuit 4
 Tran MCKINLEY 345.00 to YAHTAHEY 115.00 Circuit 2
 Tran APACHE 230.00 to APACHE 115.00 Circuit 1
 Tran APACHE 230.00 to APACHE 115.00 Circuit 2
 Tran BICKNELL 230.00 to BICKNELL 115.00 Circuit 1
 Tran BICKNELL 230.00 to BICKNELL 115.00 Circuit 2
 Tran BICKNELL 345.00 to BICKNELL 230.00 Circuit 1
 Tran CS1 345.00 to CS1 115.00 Circuit 1
 Tran GREEN-SW 345.00 to GREEN-SW 230.00 Circuit 1
 Tran GREEN-SW 345.00 to GREEN-SW 230.00 Circuit 2
 Tran PANTANO 230.00 to PANTANO 115.00 Circuit 1
 Tran WINCHSTR 345.00 to WINCHSTR 230.00 Circuit 1
 Tran PERKINS 500.00 to PERK PS1 500.00 Circuit 1
 Tran PERKINS 500.00 to PERK PS2 500.00 Circuit 1
 Tran RUDD 500.00 to RUDD 230.00 Circuit 3A
 Tran DUKE 500.00 to TESTTRAK 230.00 Circuit 1
 Tran DUKE 500.00 to TESTTRAK 230.00 Circuit 2
 Tran MESQUIT2 500.00 to MESQUITE 230.00 Circuit 2
 Tran PRESCOTT 230.00 to PRESCOTT 115.00 Circuit 1
 Tran PRESCOTT 230.00 to PRESCOTT 115.00 Circuit 2
 Tran SNMANUEL 115.00 to SNMANUEL 100.00 Circuit 1
 Tran FOURCORN 500.00 to FOURCORN 345.00 Circuit 1
 Tran FOURCORN 345.00 to FOURCORN 230.00 Circuit 1
 Tran FOURCORN 345.00 to FOURCORN 230.00 Circuit 2
 Tran CHOLLA 500.00 to CHOLLA 345.00 Circuit 1
 Tran CHOLLA 500.00 to CHOLLA 345.00 Circuit 2
 Tran CHOLLA 345.00 to CHOLLA 230.00 Circuit 1
 Tran MORGAN 500.00 to RACEWAY 230.00 Circuit 1
 Tran MORGAN 500.00 to RACEWAY 230.00 Circuit 2
 Tran YAVAPAI 500.00 to YAVAPAI 230.00 Circuit 1
 Tran YAVAPAI 500.00 to YAVAPAI 230.00 Circuit 2
 Tran SAGUARO 500.00 to SAG.EAST 115.00 Circuit 1
 Tran SAGUARO 500.00 to SAG.WEST 115.00 Circuit 1
 Tran SNVLY 500.00 to SNVLY 230.00 Circuit 1
 Tran SNVLY 500.00 to SNVLY 230.00 Circuit 2

Appendix E – Power Flow Results

The following table shows SRP elements loaded at 80% of their thermal limit or higher. The table shows the rating and flow of each transmission line in Amperes, and each transformer rating and flow is shown in MVA. Beginning in 2017 of the study, in the event one of the two Mesquite 500/230kV transformers was out of service, the remaining transformer would overload if all generation interconnected to the Mesquite switchyard was generating at full capacity.

2013	Loaded Element	Rating	Actual	% Loading	Outage Element
	Mesquite 500/230kV Transformer #1	1500	1398	94%	Mesquite 50/230kV Transformer #2
	Mesquite 500/230kV Transformer #2	1500	1398	94%	Mesquite 50/230kV Transformer #1
2014	Loaded Element	Rating	Actual	% Loading	Outage Element
	Mesquite 500/230kV Transformer #1	1500	1354	91%	Mesquite 50/230kV Transformer #2
	Mesquite 500/230kV Transformer #2	1500	1354	91%	Mesquite 50/230kV Transformer #1
2015	Loaded Element	Rating	Actual	% Loading	Outage Element
	None				
2016	Loaded Element	Rating	Actual	% Loading	Outage Element
	Mesquite 500/230kV Transformer #1	1500	1407	95%	Mesquite 50/230kV Transformer #2
	Mesquite 500/230kV Transformer #2	1500	1407	95%	Mesquite 50/230kV Transformer #1
2017	Loaded Element	Rating	Actual	% Loading	Outage Element
	Mesquite 500/230kV Transformer #1	1500	1556	104%	Mesquite 50/230kV Transformer #2
	Mesquite 500/230kV Transformer #2	1500	1556	104%	Mesquite 50/230kV Transformer #1
2018	Loaded Element	Rating	Actual	% Loading	Outage Element
	Mesquite 500/230kV Transformer #1	1500	1569	105%	Mesquite 50/230kV Transformer #2
	Mesquite 500/230kV Transformer #2	1500	1569	105%	Mesquite 50/230kV Transformer #1
2019	Loaded Element	Rating	Actual	% Loading	Outage Element
	Mesquite 500/230kV Transformer #1	1500	1538	103%	Mesquite 50/230kV Transformer #2
	Mesquite 500/230kV Transformer #2	1500	1538	103%	Mesquite 50/230kV Transformer #1
	Browning 230/69kV Transformer	280	230	83%	None (N-0 loading)
2020	Loaded Element	Rating	Actual	% Loading	Outage Element
	Mesquite 500/230kV Transformer #1	1500	1938	129%	Mesquite 50/230kV Transformer #2
	Mesquite 500/230kV Transformer #2	1500	1938	129%	Mesquite 50/230kV Transformer #1
	Browning 230/69kV Transformer	280	233	84%	None (N-0 loading)
2021	Loaded Element	Rating	Actual	% Loading	Outage Element
	Mesquite 500/230kV Transformer #1	1500	1948	130%	Mesquite 50/230kV Transformer #2
	Mesquite 500/230kV Transformer #2	1500	1948	130%	Mesquite 50/230kV Transformer #1
	Browning 230/69kV Transformer	280	246	89%	None (N-0 loading)
2022	Loaded Element	Rating	Actual	% Loading	Outage Element
	Mesquite 500/230kV Transformer #1	1500	1948	130%	Mesquite 50/230kV Transformer #2
	Mesquite 500/230kV Transformer #2	1500	1948	130%	Mesquite 50/230kV Transformer #1
	Browning 230/69kV Transformer	280	256	92%	None (N-0 loading)

SRP also monitored bus voltage that dropped more than 5% from pre-outage to post-outage. For this Ten Year Plan horizon no voltages exceeded 5%, resulting in no voltage deviations.

Appendix F – Transient Stability List

500kV Outage List

ABEL-BROWNING	KYRENE-JOJOBA
ABEL-PINAL CENTRAL	PINAL CENTRAL 500/230kV Transformer 1
BROWNING 500/230 kV Transformers 1&2	PINAL CENTRAL 500/230kV Transformer 2
BROWNING-KYRENE	PINAL CENTRAL-ABEL
BROWNING-SILVER KING	PINAL CENTRAL-TORTOLITA
CORONADO Generator 1	PALO VERDE Generator 1
CORONADO Generator 2	PALO VERDE Generator 2
CORONADO 500/345kV Transformers 1&2	PALO VERDE Generator 3
CORONADO-SILVER KING	PALO VERDE-COLORADO RIVER
CORONADO-SUGARLOAF	PALO VERDE-DELANY
HASSAYAMPA-ARLINGTON	PALO VERDE-HASSAYAMPA Circuit 1
HASSAYAMPA-GILA	PALO VERDE-HASSAYAMPA Circuit 2
HASSAYAMPA-HARQUAHA	PALO VERDE-HASSAYAMPA Circuit 3
HASSAYAMPA-HOODOO WASH	PALO VERDE-RUDD
HASSAYAMPA-JOJOBA	PALO VERDE-WEST WING Circuit 1
HASSAYAMPA-MESQUITE Circuit 1	PALO VERDE-WEST WING Circuit 2
HASSAYAMPA-MESQUITE Circuit 2	PINAL WEST 500/69kV Transformer
HASSAYAMPA-PALO VERDE Circuit 1	PINAL WEST 500/345kV Transformer
HASSAYAMPA-PALO VERDE Circuit 2	PINAL WEST-HASSAYAMPA
HASSAYAMPA-PALO VERDE Circuit 3	PINAL WEST-DUKE
HASSAYAMPA-PINAL WEST	RUDD 500/230kV Transformers 1&2
HASSAYAMPA-RED HAWK Circuit 1	RUDD 500/230kV Transformers 3&4
HASSAYAMPA-RED HAWK Circuit 2	RUDD-PALO VERDE
JOJOBA-GILA Circuit 1	SILVER KING 500/230kV Transformer
JOJOBA-GILA Circuit 2	SILVER KING-BROWNING
JOJOBA-HASSAYAMPA	SILVER KING-CORONADO
JOJOBA-KYRENE	DUKE 500/230kV Transformer
KYRENE 500/230kV Transformer 6	DUKE-PINAL CENTRAL
KYRENE 500/230kV Transformer 7	DUKE-PINAL WEST
KYRENE 500/230kV Transformer 8	SUGARLOAF 500/69kV Transformer
KYRENE-BROWNING	SUGARLOAF-CHOLLA
	SUGARLOAF-CORONADO

230kV Outage List

ABEL 230/69kV Transformer
ABEL-DINOSAUR
ABEL-RANDOLPH
AGUA FRIA Generator 4
AGUA FRIA Generators 5&6
AGUA FRIA 230/69kV Transformer 3
AGUA FRIA 230/69kV Transformer 4
AGUA FRIA APS 230/69kV Transformer 5
AGUA FRIA-ALEXANDER
AGUA FRIA-EL SOL
AGUA FRIA-GLENDALE
AGUA FRIA-WHITE TANKS
AGUA FRIA-WEST WING
ANDERSON 230/69kV Transformer 1
ANDERSON 230/69kV Transformer 2
ANDERSON 230/69kV Transformer 3
ANDERSON 230/69kV Transformer 4
ANDERSON-KYRENE NEW
ANDERSON-ORME Circuit 1
ANDERSON-ORME Circuit 2
ALEXANDER 230/69kV Transformer 1
ALEXANDER 230/69kV Transformer 2
ALEXANDER 230/69kV Transformer APS
ALEXANDER-AGUA FRIA
ALEXANDER-DEER VALLEY
BRANDOW 230/69kV Transformer 1
BRANDOW 230/69kV Transformer 2
BRANDOW 230/69kV Transformer 3
BRANDOW-KYRENE
BRANDOW-PAPAGO BUTTES
BRANDOW-PINACLE PEAK Circuit 2
BRANDOW-PINACLE PEAK Circuit 4
BRANDOW-WARD Circuit 1
BRANDOW-WARD Circuit 2
BROWNING 230/69kV Transformer 4
BROWNING 500/230kV Transformer 1&2
BROWNING-DINOSAUR
BROWNING-SANTAN
CORBELL 230/69kV Transformer 2
CORBELL 230/69kV Transformer 3
CORBELL 230/69kV Transformer 4
CORBELL-KYRENE
CORBELL-SANTAN

DESERT BASIN Generator 1
DESERT BASIN Generator 2
DESERT BASIN-CASA GRANDE
DESERT BASIN-PINAL CENTRAL
DESERT BASIN-SANTA ROSA
DINOSAUR 230/69kV Transformer
DINOSAUR-ABEL
DINOSAUR-BROWNING
GOLDFIELD 230/115kV Transformer 1
GOLDFIELD 230/115kV Transformer 2
GOLDFIELD-SILVER KING
GOLDFIELD-THUNDERSTONE Circuit 1
GOLDFIELD-THUNDERSTONE Circuit 2
KNOX 230/69kV Transformer
KNOX-KYRENE NEW
KNOX-SANTA ROSA
KYRENE Generator 5&6
KYRENE 230/69kV Transformer 2
KYRENE 230/69kV Transformer 3
KYRENE 230/69kV Transformer 4
KYRENE 500/230kV Transformer 7
KYRENE 500/230kV Transformer 8
KYRENE-BRANDOW
KYRENE-CORBELL
KYRENE-KYRENE NEW
KYRENE NEW 500/230kV Transformer 6
KYRENE NEW-ANDERSON
KYRENE NEW-KNOX
KYRENE NEW-KYRENE
KYRENE NEW-OCOTILLO
KYRENE NEW-PAPAGO BUTTES
KYRENE-SCHRADER
ORME 230/69kV Transformer 1
ORME 230/69kV Transformer 2
ORME 230/69kV Transformer 3
ORME 230/69kV Transformer 4
ORME-ANDERSON Circuit 1
ORME-ANDERSON Circuit 2
ORME-RUDD Circuit 1
ORME-RUDD Circuit 2
PAPAGO BUTTES 230/69kV Transformer 1
PAPAGO BUTTES 230/69kV Transformer 2
PAPAGO BUTTES 230/69kV Transformer 3

PAPAGO BUTTES 230/69kV Transformer 4
 PAPAGO BUTTES-BRANDOW
 PAPAGO BUTTES-KYRENE NEW
 PAPAGO BUTTES-PINNACLE PEAK
 PINAL CENTRAL 500/230kV Transformer 1
 PINAL CENTRAL 500/230kV Transformer 2
 PINAL CENTRAL-DESERT BASIN
 PINAL CENTRAL-RANDOLPH
 PINAL CENTRAL-SUN ARIZONA
 PINNACLE PEAK-BRANDOW Circuit 2
 PINNACLE PEAK-BRANDOW Circuit 4
 PINNACLE PEAK-DEER VALLEY
 PINNACLE PEAK-PAPAGO BUTTES
 PINNACLE PEAK-PINNACLE PEAK APS Circuit 1
 PINNACLE PEAK-PINNACLE PEAK APS Circuit 2
 PINNACLE PEAK-PINNACLE PEAK WAPA Circuit 1
 PINNACLE PEAK-PINNACLE PEAK WAPA Circuit 2
 RANDOLPH-ABEL
 RANDOLPH-PINAL CENTRAL
 ROGERS 230/69kV Transformer 2
 ROGERS 230/69kV Transformer 4
 ROGERS-ROGERS WAPA Circuit 1
 ROGERS-ROGERS WAPA Circuit 2
 ROGERES-THUNDERSTONE
 RUDD 230/69kV Transformer 1
 RUDD 500/230kV Transformers 1&2
 RUDD 500/230kV Transformers 3&4
 RUDD-LIBERTY
 RUDD-ORME Circuit 1
 RUDD-ORME Circuit 2
 RUDD-PALO VERDE
 RUDD-W PHOENIX APS
 RUDD-WHITE TANKS
 RUDD-WHITE TANKS APS
 SCHRADER 230/69kV Transformer 1

SCHRADER 230/69kV Transformer 3
 SCHRADER 230/69kV Transformer 4
 SCHRADER-KYRENE
 SCHRADER-SANTAN
 SILVER KING 500/230kV Transformer
 SILVER KING 230/115kV Transformer 1
 SILVER KING 230/115kV Transformer 2
 SILVER KING-GOLDFIELD
 SANTAN Generator 5
 SANTAN Generator 6
 SANTAN Generator 1&3
 SANTAN 230/69kV Transformer 3
 SANTAN 230/69kV Transformer 4
 SANTAN 230/69kV Transformer 5
 SANTAN-BROWNING
 SANTAN-CORBELL
 SANTAN- SCHRADER
 SANTAN- THUNDERSTONE
 THUNDERSTONE 230/69kV Transformer 1
 THUNDERSTONE 230/69kV Transformer 2
 THUNDERSTONE 230/69kV Transformer 3
 THUNDERSTONE 230/69kV Transformer 4
 THUNDERSTONE-GOLDFIELD Circuit 1
 THUNDERSTONE-GOLDFIELD Circuit 2
 THUNDERSTONE-ROGERS
 THUNDERSTONE-SANTAN
 WARD 230/69kV Transformer 1
 WARD 230/69kV Transformer 2
 WARD-BRANDOW Circuit 1
 WARD-BRANDOW Circuit 2
 WHITE TANKS 230/69kV Transformer 1
 WHITE TANKS 230/69kV Transformer 3
 WHITE TANKS-AGUA FRIA
 WHITE TANKS-RUDD

115kV Outage List

CRUSHER-COOLIDGE
CRUSHER-HAYDEN
FRAZIER-HORSE MESA
FRAZIER-MOONSHINE
FRAZIER-ROOSEVELT
GOLDFIELD-HORSE MESA
GOLDFIELD-MORMON FLAT
GOLDFIELD-SPURLOCK
HAYDEN-CRUSHER
HAYDEN-KNOLL
HORSE MESA Generator 4
HORSE MESA Generator 1,2,3
HORSE MESA-FRAZIER
HORSE MESA-GOLDFIELD
HORSE MESA-MORMON FLAT
KNOLL-HAYDEN
KNOLL-SUPERIOR
MORMON FLAT Generator 1&2
MORMON FLAT-GOLDFIELD
MORMON FLAT-HORSE MESA

MIAMI-MOONSHINE
MIAMI-PINAL
MIAMI-PINTO VALLEY
MOONSHINE-FRAZIER
MOONSHINE-MIAMI
MOONSHINE-PINAL
OAK FLAT-PINAL
PINAL-MIAMI
PINAL-MOONSHINE
PINAL-OAK FLAT
PINTO VALLEY-MIAMI
PINTO VALLEY-SUPERIOR
ROOSEVELT-FRAZIER
SPURLOCK-GOLDFIELD
SPURLOCK-SUPERIOR
SUPERIOR-KNOLL
SUPERIOR-OAK FLAT
SUPERIOR-PINTO VALLEY
SUPERIOR-SPURLOCK

Appendix G – Transient Stability Plots

Due to the large number of plots, the results for the Transient Stability will be made available upon request. Please send an email to transmissionplanning@srpnet.com for requests.